

The REFRIGERATION & AIRCONDITIONING *Business*

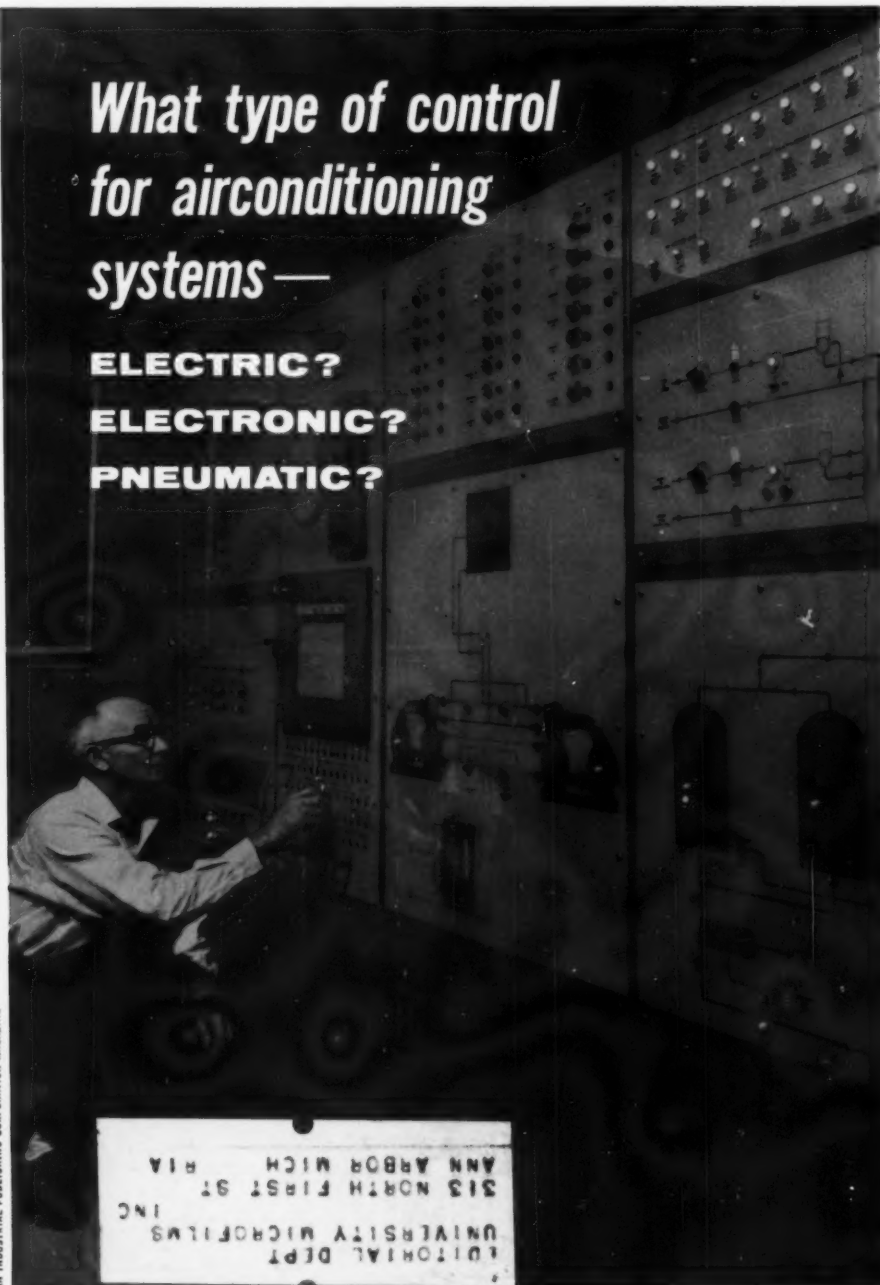
NOVEMBER 1961

**What type of control
for airconditioning
systems —**

ELECTRIC?

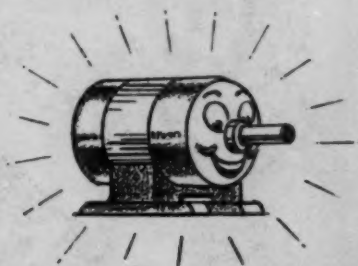
ELECTRONIC?

PNEUMATIC?



EDITORIAL DEPT
UNIVERSITY MICROFILMS
INC
313 NORTH FIRST ST
ANN ARBOR MICH 48106

**HOW TO CLEAN
ELECTRIC
MOTORS**



Upgrade:
PROJECT

A manufacturer and
a contractor
reappraise the
5-year warranty

**The magazine for the Installing Contractor-Dealer of airconditioning
and commercial and industrial refrigeration**

...when the billets
won't even say "ouch"



The great new primary mill at Viking Copper Tube was designed from push-button to piercer with a single purpose—to produce the highest quality thin wall copper tube under the most efficient methods known. Men and machines of special skills were brought to Viking to create the smoothest running yet most scientifically controlled mill in the country. When you see the care and precision with which even billets are handled by ingeniously designed machinery, you will understand why they never say "ouch." At Viking, tube starts out in quality-style... so that it can end the same way. Isn't that how you want it?



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CAN A SINGLE MOISTURE INDICATING ELEMENT ACCURATELY SIGNAL DANGER IN BOTH REFRIGERANT 12 AND REFRIGERANT 22?



Of course it can't! And yet 4 out of the 5 manufacturers of moisture indicators have asked the refrigeration industry to accept the fact that one element can do the job...against all the rules of common sense and all the evidence of science. R-12 and R-22 have radically different characteristics and there's a big difference in how much moisture each refrigerant can stand before serious trouble develops in the system. Ansul's 200 "Dry-Eye" moisture indicators are the only ones that employ two separate indicating elements—one for R-12, one for R-22. The L-200 can be installed alone or with the new Ansul "System Boss" drier . . . the T-200 is designed for use with the unique Ansul "T-Flo" drier to create another complete moisture control system. Want scientific proof of what really happens when a single R-12 element is called upon to signal trouble in an R-22 system? Write and we'll send a research bulletin . . . or ask your refrigeration wholesaler. ANSUL CHEMICAL COMPANY, MARINETTE, WIS.



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The REFRIGERATION & AIRCONDITIONING Business

NOVEMBER 1961

FEATURES

33 Let's Talk Business: editorial of the month

Upgrade

Take a look in the mirror, Mr. Contractor. You'll see that brand loyalty isn't one of your outstanding traits.

35 What type of control for airconditioning systems?

This objective discussion covers electric, electronic, and pneumatic controls — how they work, where to use them

38 The 5-year warranty — what's wrong with it?

Upgrade

"Plenty" say this contractor and this manufacturer as they offer some constructive suggestions to ease the problem

40 Sell the same piece of equipment again and again

A Cleveland refrigeration distributor does it up to 15 times — and makes a handsome profit on each sale

42 Foil insulation cuts warehouse cooling costs

Many dollars are shaved from equipment cost and operating cost by proper balance of insulation and airconditioning

45 Service Clinic for Contractors

How to clean electric motors to keep them in top shape, make them last longer

47 Applications Manual — airconditioning

Backyard swimming pools offer a ready market for heat pump sales, especially in mild climates. As you cashing in?

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editorial assistant

DAVID KINSLER
distilled writing

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art director



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DEPARTMENTS

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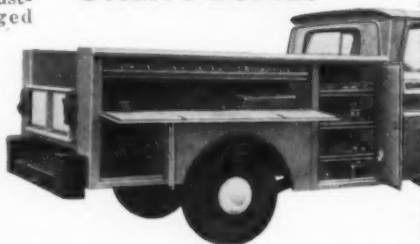


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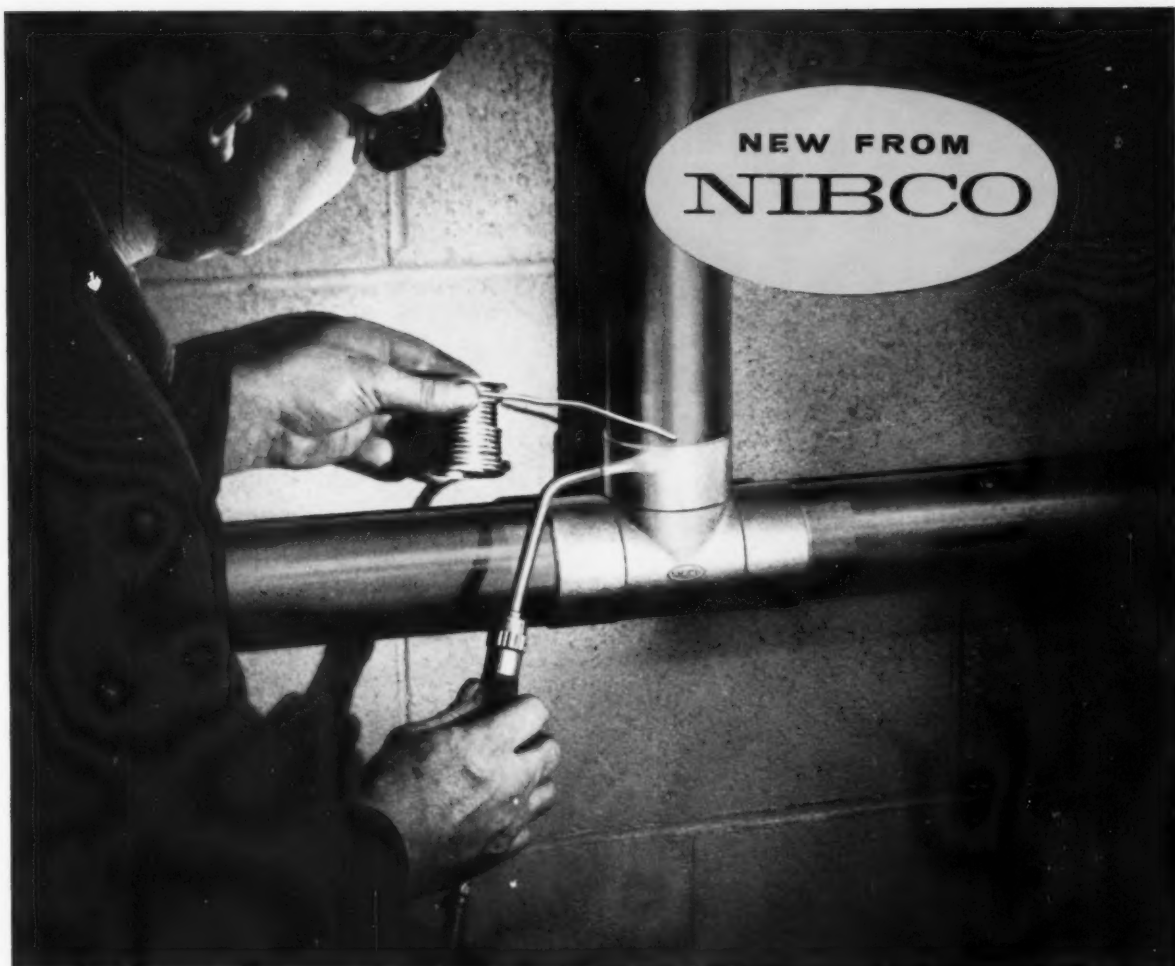
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COLOR GUARD
WROT AND CAST FITTINGS

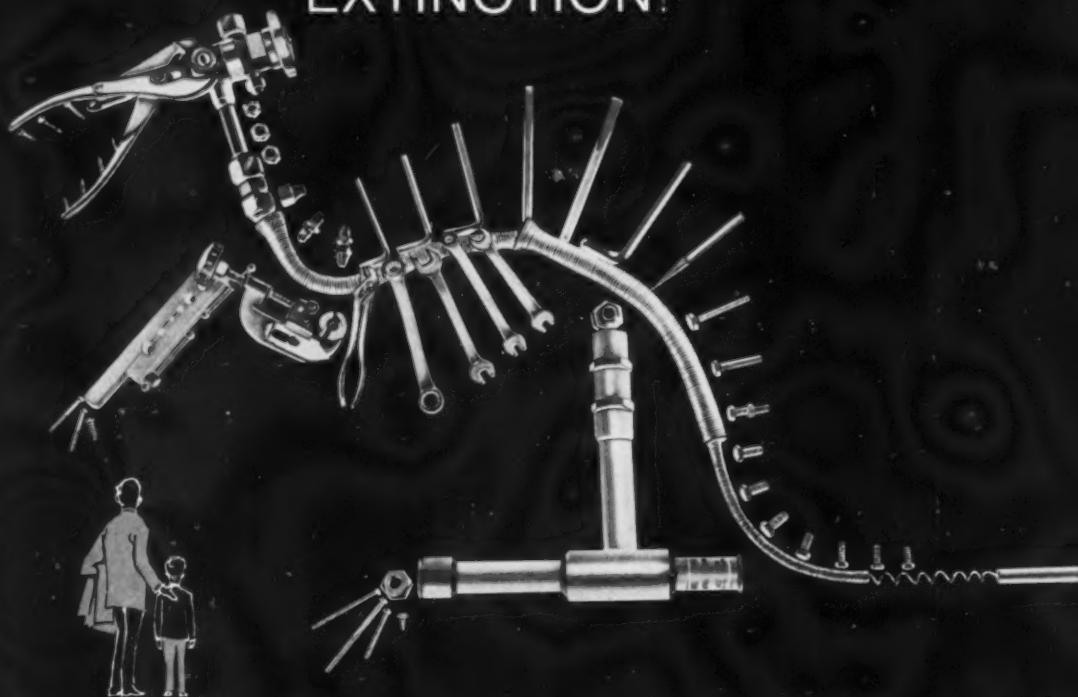


Patent applied for

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FIELD FABRICATED REFRIGERATION SYSTEMS ARE DESTINED FOR EXTINCTION!



NEW KRAMER THERMOBANK-COMPRESSOR Systems make field-fabrication as obsolete as dinosaurs and open a new era of opportunity in refrigeration.

Gone is expensive, time-consuming and inefficient field-fabrication of refrigeration systems and with it your major headaches—shortage of skilled manpower and uncertain costs! Kramer's THERMOBANK-COMPRESSOR SYSTEMS are complete systems (high side and low side), factory engineered, instrumented, assembled, tested and run-in. For outdoor installations, they arrive on the job in all-weather aluminum housings, and "Winterstated" for year-'round automatic operation.

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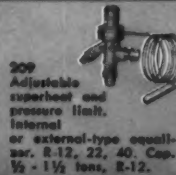
207C
Adjustable superheat, internally equalized. R-12, 22, 40. Cap. 1/2 - 1 1/2 tons, R-12.



207D
Adjustable superheat, internal or external-type equalizer. R-12, 22, 40. Cap. 1/2 - 3 tons, R-12.



214
Adjustable superheat. External-type equalizer. Solder connections. R-12, 22. Cap. 1 - 3 tons, R-12.



209
Adjustable superheat and pressure limit. Internal or external-type equalizer. R-12, 22, 40. Cap. 1/2 - 1 1/2 tons, R-12.



217
Adjustable superheat. External-type equalizer. Solder connections. R-12, 22. Cap. 5 - 12 1/2 tons, R-12.



218
Duo-file construction. Adjustable superheat. External-type equalizer. R-12, 22. Cap. 16-25 tons, R-12.

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304C
Calibrated adjustment (no gauge needed). R-12, 22, 40. Cap. 1/2 ton, R-12.



304C
Adjustable 10" to 75 psig. R-12, 22, 40. Cap. 1 ton, R-12.

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45, 45H
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410
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402
Trap-d filter. Removes dirt. 1/4" to 1/2" flare connections.



414
Jet-Dri. Removes water, acid. 1/4" flare connections.



237
Opens on outlet pressure decrease. Cap. 1 1/2 - 3 tons, R-12.



2355
Opens on inlet pressure increase. Adjustable 0-40 psig. 20-70 psig.



239
Opens on inlet pressure increase. Cap. 6-14 tons, liquid R-12. Adjustable 40-140 psig. 80-210 psig.

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SOLENOID VALVES FOR NONCORROSIVE REFRIGERANTS OR WATER



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Metal-to-metal or soft resilient seat. 3/32" orifice. 1/2" NPT or OD solder.



73
Outlet, floating plunger. 3/32", 3/16" or 7/32" orifice. 1/2" NPT, flare, or 1/2" ODF.



271
13/32" orifice. 1/2" or 1/4" NPT, 1/2" ODF or 1/2" ODM.



272
17/32" orifice. 1/2" NPT, 1/2" ODF or 1/2" ODM.



273
1/2" orifice. 1" NPT, 1 1/4" ODF or 1 1/4" ODM.



274
1" orifice. 1 1/2" NPT, 1 1/2" ODF or 1 1/2" ODM, 1 1/2" ODF or 1 1/2" ODM.

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For most cars. 3/8" inlet, 1/8" or 1/2" outlet, internal or external-type equalizer. Pressure limiting 1 1/2 ton, R-12. Factory-set superheat.

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230
Cap. 1/2-50 tons, R-12. 1/4" to 1 1/4" ODF inlet. Removable orifice.

619 DEVICES

for refrigeration and air conditioning control and their full specifications are organized for quick reference in the newest CC catalog. Only the basic models are illustrated on this page. *You should have the whole catalog.* Write for CC Catalog W-5-S today to the address below.

Visit Booth 803 at Heating and Air Conditioning Exposition, Chicago, Feb. 13-16, 1961.



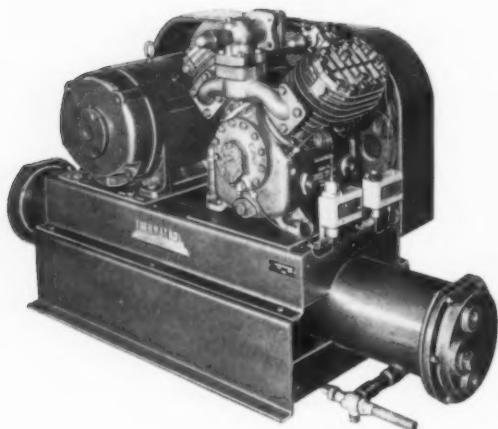
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HEATING AND AIR CONDITIONING DIVISION

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HAC-36-60



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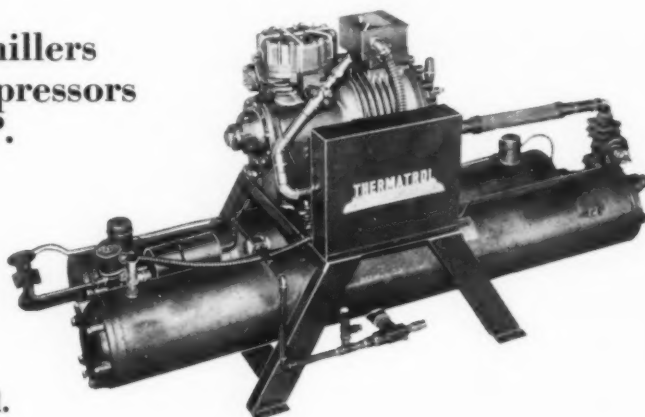
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to
75 H.P.
R-12
and
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The most ruggedly built compressor in the industry with the latest design for the versatile belt drive which is adaptable for all applications by use of variable speeds. The most economical compressor for new installations and the most practical compressor to replace any belt driven compressor with a minimum of labor. All models have interchangeable wearing parts which simplify the service problems. New type internal seals and rugged disc ring type valves — refrigerant cooled replaceable sleeves and replaceable bearing inserts, forged crankshafts and connecting rods, forced feed lubrication to all bearings and seal.

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Schnacke, Inc., Evansville 7, Ind.

**NOTE — Refrigeration Wholesalers!
Write or phone for details of jobber plans.**

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Crashes the Interference Barrier!

Knocks Down Costs!



Opens the way to broader uses of 2-way radio...in any business!

Here's new Efficiency in mobile communications—RCA's new "E" Line—a quality 450 MC 2-way radio that screens out co-channel interference, skip signals and ignition noise, yet keeps costs down to a minimum!

This is the finest UHF 2-way radio ever offered by RCA... and at the lowest price! Combined control head, speaker and power supply unit mounts in less

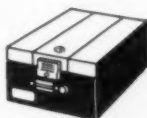
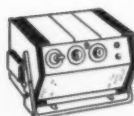
than 7" space to completely eliminate under-dash clutter. Transistor powered, the "E" Line is easiest to install, and operate, 6 or 12 volt power supply, interchangeable, without wire changes or soldering.

Now, the money-making, time-saving advantages of 2-way radio are available for every business! Your choice of lease or purchase plans. Send coupon for complete information.



The Most Trusted Name
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RADIO CORPORATION OF AMERICA

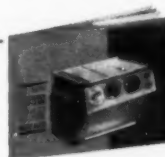


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RADIO CORPORATION OF AMERICA
Telecommunication Center, Dept. B-261
Meadow Lands, Pa.

- ☐ Please send literature on the new RCA "E-Line" 2-Way Radio for 450 mc band.
☐ Have Communications Specialist call.

NAME _____ TITLE _____
FIRM _____
TYPE OF BUSINESS _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____



BUSINESS *Briefs*

HOW OUR BUSINESS IS DOING

SALES IN JULY (Bureau of Census) for airconditioning and commercial refrigeration equipment distributors, contractors, and wholesalers:

DOWN 4% from a year ago

NO CHANGE from previous month

SALES FOR 1961 so far are:

DOWN 7% from 1st 7 months a year ago

INVENTORIES IN JULY (Bureau of Census) for airconditioning and commercial refrigeration equipment distributors, contractors, and wholesalers:

DOWN 3% from a year ago

DOWN 1% from previous month

CURRENT LIABILITIES IN AUGUST for business failures of 2 airconditioning contractors were \$60,000 (Dun & Bradstreet). Compare this to:

No failures in July

1 failure with \$30,000 liabilities a year ago

GENERAL BUSINESS INDICATORS

	Latest Period	Previous Period	% Change
Housing Starts (thousands)			
Month ending 8/31/61	129.2	127.9	+1.0
New Construction , put in place (\$ billions)			
Month ending 8/31/61	5.4	5.4	No change
Unemployment (% of labor force)			
Month ending 8/31/61	6.9	6.9	No change
Manufacturers' Inventories (\$ billions)			
Month ending 7/31/61	53.6	53.4	+ .4
Manufacturers' Unfilled Orders (\$ billions)			
Month ending 7/31/61	46.8	45.9	+1.9
Retail Sales (\$ billions)			
Month ending 8/31/61	18.1	18.1	No change
Personal Saving (\$ billions)			
Quarter ending 6/30/61	25.8	23.7	+8.9
Disposable Personal Income (\$ billions)			
Quarter ending 6/30/61	361.8	354.3	+2.1
Gross National Product (\$ billions)			
Quarter ending 6/30/61	516.1	500.8	+3.1
Industrial Production Index (1957=100)			
Month ending 8/31/61	111	106	+4.7

Source: U.S. Dept. of Commerce

CRMA predicts '61 will see year-end business upsurge

Look for a year-end rise in commercial refrigeration sales when final figures for 1961 are in. That's the opinion the economic forecast panel came up with at the annual meeting of the Commercial Refrigerator Manufacturers Association. The panel expects an overall increase in the last six months of 3 to 5%, compared to an industry gain of only 1.7% for the first half.

One source of new business is expected to come from independent food retailers who are learning one way to combat chain stores is by remodeling and installing new fixtures, including refrigerated cases. Another is the growing demand for the industry's newest product, the multideck frozen food display case. CRMA members were told the multideck case will become a must in many food stores already cramped for space as the variety of frozen foods continues to increase.

Some additional sales will also come from increased military buying as the result of the partial mobilization ordered by President Kennedy.

Another indication of increased business is CRMA's annual inventory turnover survey, which shows a composite rate of 5.13 times for 1961, a slight increase over the previous year.

Other economic indicators reported by CRMA committees:

- Despite rumors, there won't be any government price, wage, or production controls unless there is a serious crisis in the cold war.

- Bargaining settlements during the past year have resulted in some minor concessions by labor instead of the "all or nothing" tactics used in top economic conditions.

- The recession early this year stabilized the prices of raw materials and components so that there has been almost no noticeable change so far in 1961.

NEMA shows room unit sales drop

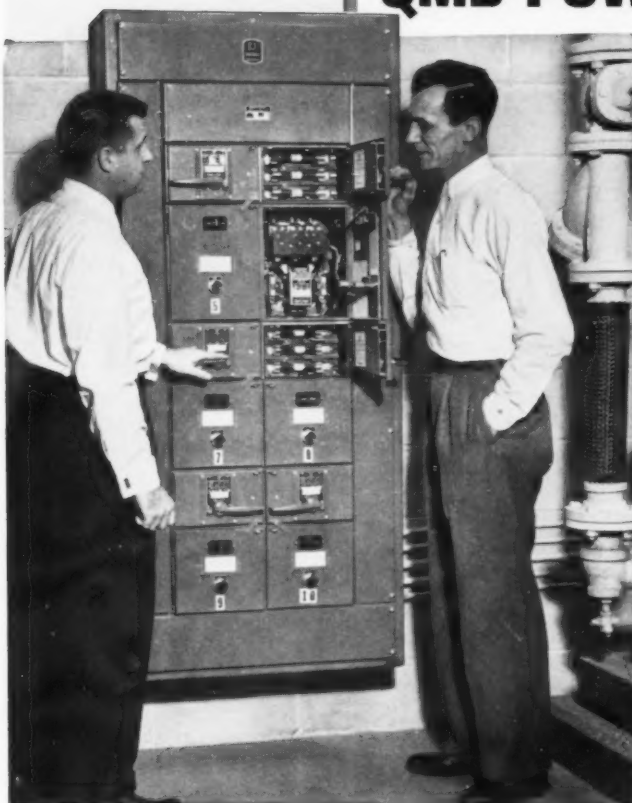
After a 40,000 unit increase over last year during the first six months of 1961, sales of room airconditioners fell behind for the current year.

Figures from the National Electrical Manufacturers Association show that room unit sales in July 1961 were over 41,000 behind the same month last year. July 1961 sales were only 76,500, compared to 117,900 in July 1960.

Totals for the first seven months of 1961 show 1,276,300 units sold, 1500 less than in the same 1960 period.

**SPACE-
TIME-
MONEY---**

Save All Three with Square D QMB POWER PANELBOARDS



**MOTOR STARTERS AND BREAKERS
OR SWITCHES COMBINED IN ONE
SPACE-SAVING PANELBOARD!**

**FACTORY-WIRED AND ASSEMBLED
OR ENCLOSURES AND COMPONENTS
AVAILABLE FROM YOUR
SQUARE D DISTRIBUTOR!**

**BREAKER AND SWITCH UNITS ARE
EXCLUSIVE PLUG-IN CONSTRUCTION.
INSTALLED OR REARRANGED
IN MINUTES!**

If the above installation had been made the old way—with trough, and ganging separate switches and starters—it would have taken at least six feet of wall space instead of 30 inches, and four times the installation time.

After this panelboard is installed, Square D's exclusive **PLUG-IN** design permits circuit changes without costly down time. For extra safety, plug-in units are mounted directly above starters, permitting interlocking. No starter or disconnect door can be opened when switch is "ON."

QMB panelboards accommodate reversing or non-reversing starters, sizes 0 through 4; plug-in circuit breakers through 225 amperes; plug-in switches through 200 amperes (bolted through 600 amperes).



Twin Unit (above)
available 15-100 amperes
Single Unit available 125-225 amperes

Exclusive Breaker Unit Advantages:

- Plug-in construction • Each unit in individual steel enclosure with dead-front construction
- Combine switch and breaker units in same panelboard, if desired

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SQUARE D COMPANY

wherever electricity is distributed and controlled

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STREAMLINE PRODUCTS ARE DEPENDABLE IN ANY REFRIGERATION OR AIR CONDITIONING APPLICATION. Available at better wholesalers everywhere. Write today for new, complete catalog.



REFRIGERATION PRODUCTS ARE DEPENDABLE...

ON A SUNNY RESIDENTIAL STREET



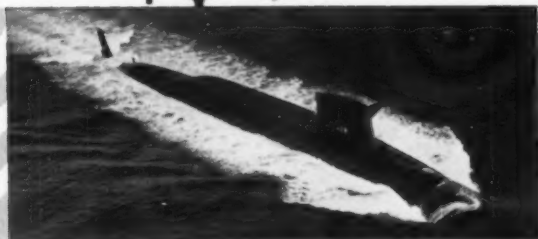
Mister Softee modernized the old-fashioned ice cream parlor, set it on wheels, and sent it ringing down almost every street in the country. To make sure customers always treat themselves to fresh, tasty, wholesome ice cream products, Mister Softee, Inc. of Runnemede, New Jersey, uses *dependable* refrigeration products made by Mueller Brass Co. These components include Drymaster-Sightmaster combinations, Streamline copper refrigeration tubing, flare fittings and wrot solder fittings.

IN THE QUIET URGENCY OF A HOSPITAL LAB



Lipshaw Manufacturing Co. of Detroit, Michigan, has developed two new low temperature medical units to help research scientists, pathologists and technologists battle cancer. Temperatures as low as 50° C below zero are attained in the "Section Freeze" and "Cryotome" units, to make possible instant freezing of tissue specimens. This permits pathological examinations while the patient is still in the operating room, thereby often eliminating the necessity of a second operation. In the laboratory test stage, both units had difficult refrigerant moisture problems... solved when Lipshaw's chief engineer changed to *dependable* Drymaster Filter-Driers.

IN THE SILENT DEPTHS OF THE SEVEN SEAS



Dependable Streamline wrot copper solder-type fittings, which have been installed in America's nuclear submarines, are also employed in the Fleet Ballistic Missile Submarine, the Ethan Allen, built by the Electric Boat Division of General Dynamics Corporation of Groton, Connecticut.



MUELLER BRASS CO. PORT HURON 14, MICHIGAN

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"We use 14 Yellow Pages ads and listings to promote all phases of our business—sales and service!" says R. E. Klein, V.P., Airway Inc., Denver, Colorado. "Most of our advertising money goes into the Yellow Pages because that's our most effective way of reaching prospects who are ready to buy! We ask people who phone us how they came to call, and again and again they say they found us through the Yellow Pages. The Yellow Pages does an outstanding job of keeping our ten phones busy — all year round!"



Display this emblem. It builds your business!

Display ad (shown reduced) runs under AIR CONDITIONING CONTRACTORS. Call the Yellow Pages man at your Bell Telephone Business Office to plan your program.

AIR CONDITIONING

ROOM AIR
CONDITIONERS

York
refrigeration
air conditioning

ICE MAKERS

PACKAGE AIR
CONDITIONING

STATE-WIDE
INSTALLATIONS

RESIDENTIAL - COMMERCIAL - INDUSTRIAL
REPAIRS & SERVICE ON ALL MAKES
"Serving You For Over 25 Years"

AIRWAY INC.

FREE ESTIMATES
"DAY OR NIGHT SAT - SUN & HOLIDAYS CALL"

2611 W. 6th Ave

AC 2-4743



Featuring Chrysler's snap-in cooling

With the new Chrysler Model 1254 for residential air conditioning, installations are faster, easier, less expensive than ever before possible. It's factory-charged, factory-tested, so there's no on-site refrigerant work. Simply run the armored line from the cooling coil to the condensing unit . . . and snap it on. Takes only a couple of minutes, and a hole through the wall the size of a single brick. You'll handle extra jobs . . . without extra help.

The Chrysler 1254 also features the all-new "deep probe" motor guard, an overload protector wired directly to the motor windings. It eliminates the need for four separate (and complicated) control components . . . increases reliability and simplifies servicing.

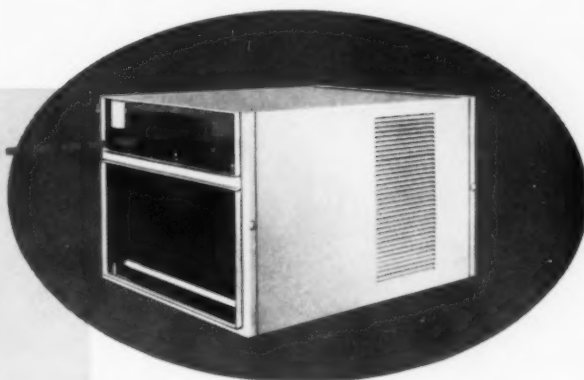
Add to these outstanding engineering advances a cooling capacity of 35,000 BTU's, and you have the most saleable system on the market.

Featuring Chrysler's New Model 1140

Built To Sell For Less Than \$500 Plus Installation

This is really great news for your builder customers, and plenty of sure sales for you, too. This high-quality, low-priced Chrysler residential or commercial air conditioner is still another example of Chrysler's engineering leadership. Fancy frills and extra weight are gone, but you can count on Chrysler's reliability and minimum service. The 1140 delivers 33,000 BTUH — enough cooling power to cool up to 2,200 square feet of living space.

All the famous Chrysler quality and engineering advances are there, too. This, plus the wonderful price you can profitably quote with confidence—less than \$500 plus installation—will put the Chrysler 1140 at the top of your list of best-sellers for '62.



WITH CHRYSLER, YOU CAN BE A SHOW-OFF

With High Quality and Low, Low Cost



Featuring Chrysler's New Gas Furnaces

These smartly-styled Lo Hi-Boy gas furnaces are ideal teammates for either the 1140 or the 1254 air conditioners above. They're available in four capacities, from 80,000 to 150,000 BTUH. All feature new step-controls for smoother, quieter starting. All have built-in bottom panels to eliminate grouting. And conveniently-located knock-outs mean faster, easier installation.

These furnaces are part of a newly-expanded Chrysler line of 34 gas furnaces specially designed to meet builder requirements . . . competitively priced, with capacities from 50,000 to 200,000 BTUH. Call your Chrysler distributor today, and see Chrysler's new line of quality air conditioners and furnaces for 1962. Or write us for your copy of "The Chrysler Line is the Quality Line."



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CHRYSLER

AIRTEMP

A Division of Chrysler Corporation
Dept. FK-111, Dayton 4, Ohio



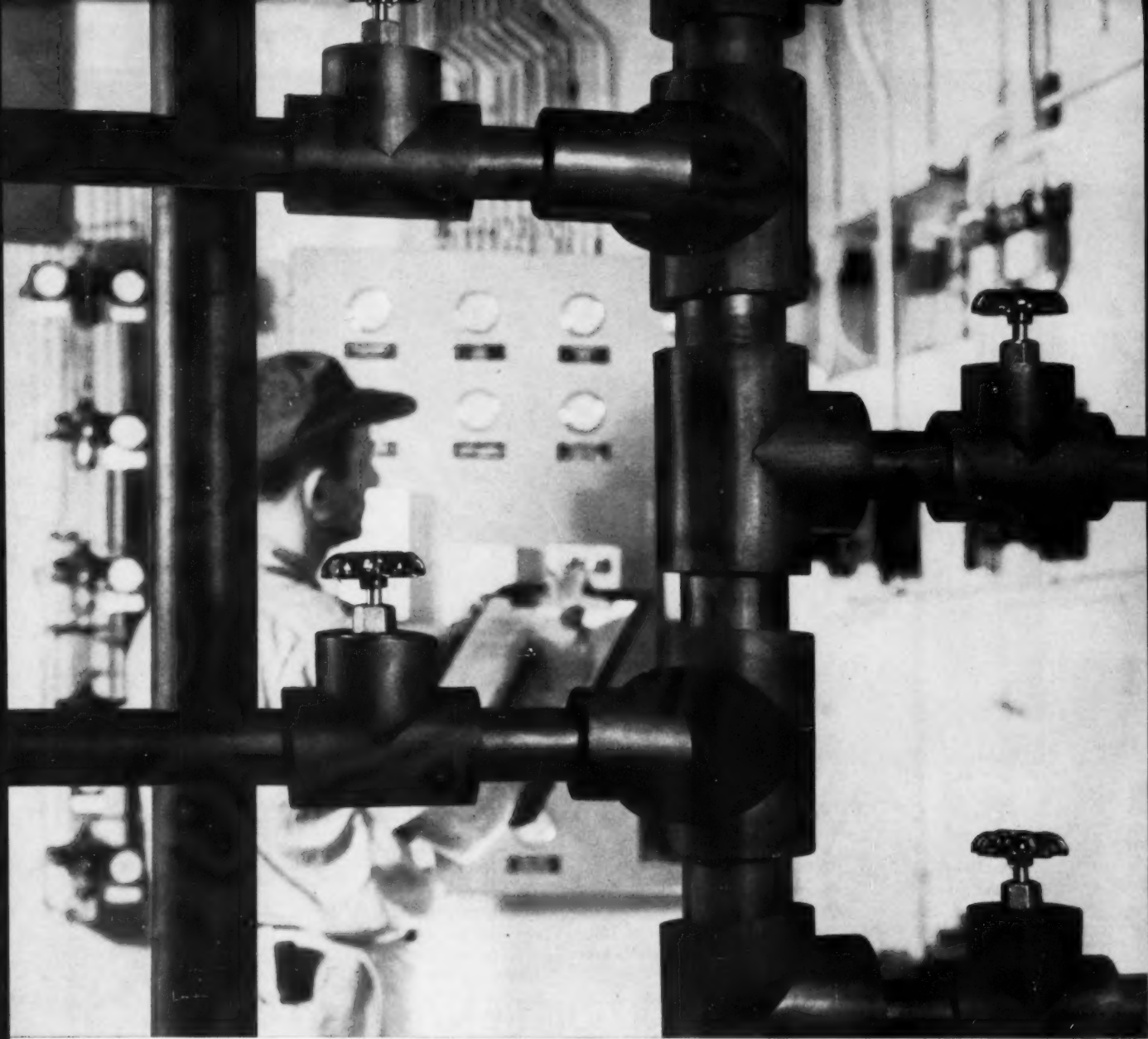
Can you understand this man's hunger for Tools?

Without them he's useless—a burden to himself and the earth. ■ With tools in his hands—a spade, a hoe, a trowel, a rake—he could raise food enough for his own family and perhaps other hungry villagers. ■ But for this man and countless others like him in Greece, in India, in Latin America and other desperately poor areas—the simplest steel implements are beyond reach. They cost too much. So millions of acres are barely scratched...with forked sticks or wooden

ploughs...and two-thirds of the world's people still go to sleep hungry. ■ Will you help them till the fertile earth...through CARE? Wherever possible, CARE food distribution is coupled with a tools-for training program that enables men and women to become self-supporting. The need was never greater, the rewards never richer. ■ *Will you buy an extra tool*—to put into hands hungry for work, food, and dignity? ■ Send dollars to CARE, New York 16.

CARE COOPERATIVE FOR AMERICAN RELIEF EVERYWHERE, INC. 660 FIRST AVE. NEW YORK 16, N.Y.	Here is \$ _____ for food <input type="checkbox"/> tools <input type="checkbox"/>
	books <input type="checkbox"/> medicine <input type="checkbox"/> CARE's choice <input type="checkbox"/>
	(PLEASE MAKE CHECKS PAYABLE TO CARE, INC.)
	NAME _____
	ADDRESS _____

(Space donated by this publication)



Here's a better, faster way to insulate fittings

The more fittings there are, the more time you save by using Armstrong Armaflex 22 Insulation—and you get a better job, too. Fitting covers are made from pieces of flexible pipe covering, miter-cut and assembled with adhesive. In application, they're simply snapped over the fittings, and joints are sealed. The job is fast, clean, good looking, long lasting, and thermally efficient.

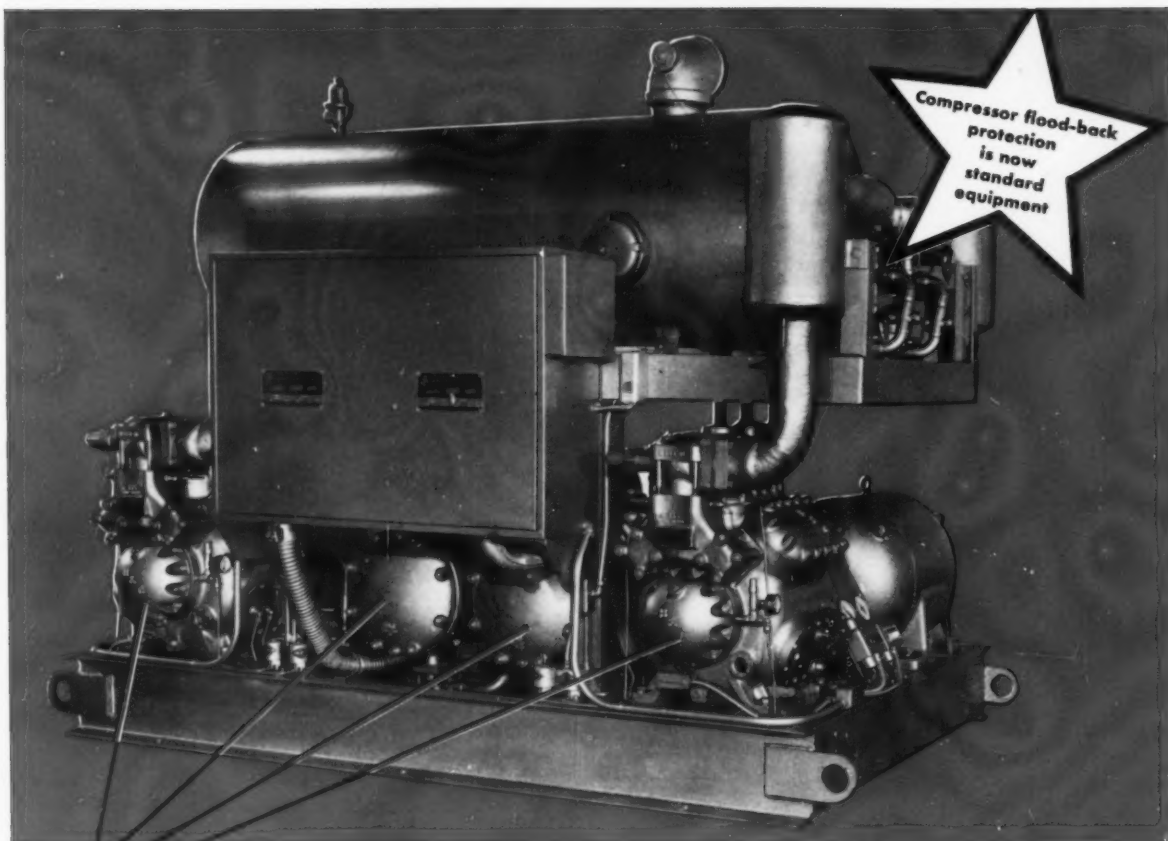
Armaflex 22 Pipe Insulation is one of a complete line of Armstrong products available through more than 300 lead-

ing wholesalers. The line includes Armaflex Sheets, Rigid Armaflex, Armaflex Finish and Adhesives. For the name of the wholesaler nearest you, and for more information on the Armaflex line, write today to Armstrong Cork Company, 2211 Roth Avenue, Lancaster, Pennsylvania.

ARMAFLEX® IS A TRADE-MARK OF ARMSTRONG CORK COMPANY

Armstrong INSULATIONS

ARMAFLEX 22 • RIGID ARMAFLEX • ARMAFLEX SHEETS • ARMAFLEX FINISH • ARMAFLEX ADHESIVES
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2 COMPLETE CIRCUITS WITH AUTOMATIC LEAD-LAG

The B&G Package Liquid Cooler is now available with two complete refrigeration circuits...dual compressors, dual condensers and a single evaporator! It has a capacity reduction of 25%—in stages of 100, 75, 50 and 25%. All operative and safety controls are installed and pre-wired.

An outstanding feature is the automatic lead-lag selector switch. In operation, No. 1 motor and compressor handle the load until cooling requirements are satisfied or until No. 2 unit needs to be called into use.

On the next starting, No. 2 unit picks up the load. Therefore each motor and compressor gets equal usage! This dual arrangement is also valuable because it provides stand-by protection in case of emergencies.

Remember, too, that all major parts of B&G "package" units are manufactured and guaranteed by Bell & Gossett Company...one responsibility for satisfactory operation.

Send for complete engineering data on B&G Air Conditioning and Refrigeration equipment.

M-PAK MODULAR PACKAGES

M-Pak units make it possible to build up from factory stock a comprehensive line of motor compressors, condensing units and package liquid coolers. Starting with five basic compressors, other stocked components are added to make up the unit desired. M-Pak Modular Packages are available for prompt delivery in capacities from 7½ to 150 tons.



B&G
Compressor



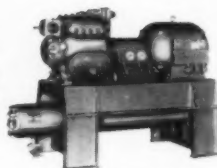
B&G
Motor Compressor



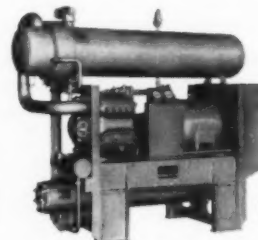
BELL & GOSSETT C O M P A N Y

Dept. GW-45, Morton Grove, Ill.

Canadian Licensee: S. A. Armstrong, Ltd.,
1400 O'Connor Drive, Toronto 16, Ontario



B&G Condensing Unit



B&G Package Liquid Cooler

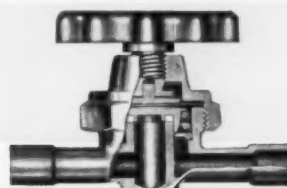
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Every product bearing the name Henry carries with it complete assurance of on-the-job satisfaction. This quality of performance and the confidence it inspires have made Henry the most accepted line in the industry. For Commercial Refrigeration and Air Conditioning Systems Using Refrigerants 12, 22 and Ammonia.

VALVES—Shut-off

Packless, Packed and Wing Cap Types
Integral and Flanged Connections



VALVES—Pressure Relief

Piston and Diaphragm Types for Atmospheric
and Vent Line Applications



VALVES—Flow Check

Spring Loaded and Free Floating Piston Types—
also for water and air



FILTER-DRIERS & Driers

"DRI-COR" Sealed and Cartridge Types
with Molded Core and Granular Desiccants



MOISTURE-LIQUID

Indicators—"DRI-VUE"—Spells and Tells
of the Presence of Acid-Creating Moisture



Also: Tube Piercing, Line Tapping, Line Port and Can Tap Valves
Strain-O-Kaps and Terminal Seals for Hermetic Compressors

HENRY VALVE COMPANY

For Refrigeration, Air Conditioning and Industrial Applications
MELROSE PARK, ILLINOIS, U.S.A. CABLE: HEVALCO, MELROSE PARK, ILL.
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©1961 VOLKSWAGEN OF AMERICA, INC.

Does a Volkswagen ever get stuck?

We cannot tell a lie.

Yes.

Then why do you see so many of our trucks zipping through the snow when others can't?

Well, it's just a little harder for a VW to get stuck.

We put the engine in the rear.

The weight presses your drive wheels

down that much harder on the snow, ice or whatnot.

It's the extra traction that turns the trick.

Our air-cooling helps, too. Volkswagens have no radiator, no water to freeze. You always go.

Our winter performance is one reason the Reliable Heating Company of

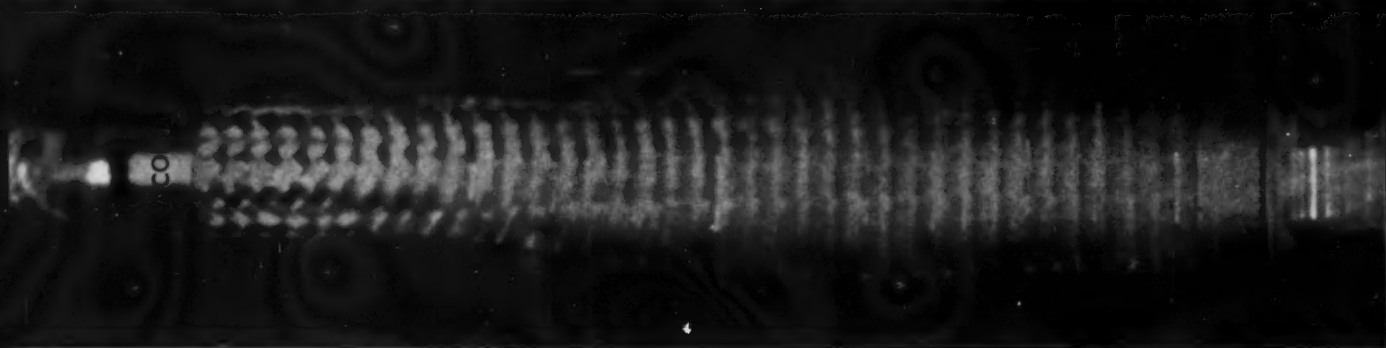
Muskegon, Michigan, feels the VW is the truck for them. When snow socks in other makes, their VW still gets through to customers.

Of course, another reason is that the VW's low operating cost—half that of a half-ton—also makes it easier to get through the end of the month.



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DOUBLE LIFETIME,



CUT DOWNTIME

Dampening Tubing Vibration With Anaconda Vibration Eliminators

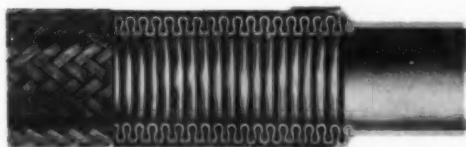
Anaconda VE's are built for endurance. Vibratory fatigue testing in Anaconda Laboratories proves VE's offer twice the service life of the nearest competitive brand . . . and up to eight times longer service than other brands! HERE'S WHY: Anaconda VE's have a seamless, flexible core of tin bronze covered by special high-tensile bronze wire braiding. Sizes 2" I.D. and larger are double braided. Every unit is pressure tested and thoroughly cleaned. Each unit is inspected throughout production . . . from a chemical analysis of components before assembly, to a detailed, final inspection

before sealing in a protective polyethylene bag.

You can count on Anaconda VE's to deliver longer life while dampening vibration in air conditioning, refrigeration, compressor units and general piping.

Recognized by Underwriters' Laboratories, Inc. under File SA 2585; sold by leading air conditioning and refrigeration wholesale distributors everywhere. For engineering information, write: Anaconda Metal Hose Division, Anaconda American Brass Company, P.O. Box 791, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

61-960



Anaconda VE, the only connector with a flexible core of seamless tin bronze and special high-tensile bronze wire braiding for longest service dampening vibration in piping.

ANACONDA **METAL HOSE DIVISION**

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WILEY BOOKS

KEEP AHEAD of this complex, fast-moving field... Read Principles of REFRIGERATION

by ROY J. DOSSAT, *University of Houston*. Every day the demand grows for more complex, more highly automatic refrigeration and air conditioning apparatus. So here and now is *the* book, the only book in print today that makes it possible for you to get ahead and stay ahead of the field. Complete in one volume you'll find all the information you need to solve everyday problems of design, installation, and servicing—no matter how complicated they may get.

THE SECRET... Gadgets that go so quickly out of date give way in this new book to simple, unchanging, basic principles applying to the operation of *all* refrigeration and air conditioning equipment. In other words, this book shows *why* equipment operates the way it does so that you can see *how* to deal with actual problems. You'll work with physics and thermodynamics, but you need no math other than basic arithmetic. This is the practical way for today.

DOWN-TO-EARTH MATERIAL... Manufacturers' catalog data, right in the book • A complete chapter on motors and control circuits, often ignored by other books • Stress on the *cyclic approach* to refrigeration, showing how each part works within the whole system • Pictures that show the various types of available equipment • Theory and practice brought together in many problems showing how to choose the right equipment. 1961. 544 pages. \$11.50.

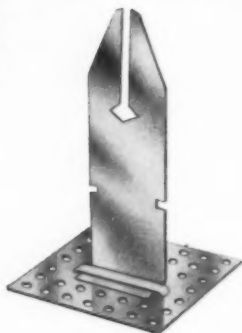
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JOHN WILEY & SONS, INC.

440 PARK AVENUE SOUTH • NEW YORK 16, N.Y.

FASTER WAY to apply insulation, helps SHRINE OF THE IMMACULATE CONCEPTION

The largest Catholic cathedral in the United States built by John McShain Inc., utilized Stic-Klip Fasteners and Adhesive for insulating its vast heating and air-conditioning duct installation. When insulation materials require fast, labor-saving, positive, permanent anchoring, plus eliminating the necessity of drilling or punching, you can't go wrong by using proven, tested, Stic-Klip Fasteners and Adhesive.



For information and samples, or an answer to a particular insulation problem, write us today:

Stic-Klip® MANUFACTURING CO.
54 Regent St., Cambridge 40, Mass.

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USEFUL Literature

MEDIUM SPEED FANS. Bulletin A-1203 discusses construction features of "HS" fans and describes available drive arrangements, configurations, and types of drive. Specific components rode on bearings, dampers, vanes, sound-absorbing bases, and drive speed control devices are described and illustrated. Capacity tables are included for a full line of 12 sizes of single-inlet single-width design and 12 sizes of double-inlet double-width design. Outline drawings are keyed to tabulated dimensional data to provide layout dimensions for each model. Typical specs are also provided. — *Industrial Div., American Standard.*

circle 206 on reader service card

CHILLED WATER COOLING COILS. Bulletin CWC-200 describes these coils which have "Turbo-Flo" finned surface for high heat transfer. The release also contains a product photo, available coil sizes, dimensional data, and manifold diameters and connection sizes. There are standard ratings by total heat and inlet water temperatures for coils with 6, 7, 8 and 10 fins per inch, and correction factor tables for inlet air wb temperature and for air velocity. — *Halstead & Mitchell Co.*

circle 207 on reader service card

292 DIFFERENT VALVES and accessories designed for ammonia refrigeration, L-P gas service, and general industrial applications are discussed in Catalog 203. Many application tables and product photos are included, together with a chart on valve capacity in pound of air per minute by set pressure psig. — *Henry Valve Co.*

circle 208 on reader service card

PREFLUXED FITTINGS are featured in a form on new "Color Guard" fittings that don't need cleaning or fluxing. An illustrated case history and laboratory report No. 62, with six photos, also highlight the brochure. — *Nibco Inc.*

circle 209 on reader service card

MAKE-UP AIR SYSTEMS. Bulletin C-101 describes six types of direct gas-fired make-up air units for roof-top, ceiling or wall mounting. A photograph, diagrams, and a chart showing capacity, horsepower, and dimensions is supplied with each unit description. A special burner section tells how steam or hot water systems can be converted to direct gas-fired units. Six photographs and descriptions of accessories are included in the booklet. — *Metals Engineering & Mfg. Co., Inc.*

circle 210 on reader service card

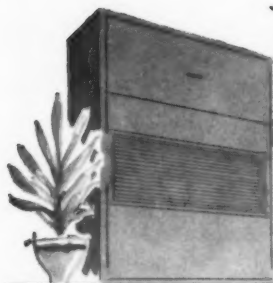
AIRFOIL FAN for industrial air handling applications is detailed in Bulletin ASQ-102. It contains design advantages, mechanical efficiency diagrams, selection tables for each of the seven sizes, and dimensional data. — *Chicago Blower Corp.*

circle 211 on reader service card

ELECTRONIC LEAK DETECTOR — Type H, portable, and halogen sensitive — is featured in Bulletin GEA-6817A. There's operational information, specs, features, accessories, ordering data, and selection of proper percent of tracer gas and test pressures in the release. — *Instrument Dept., General Electric Co.*

circle 212 on reader service card

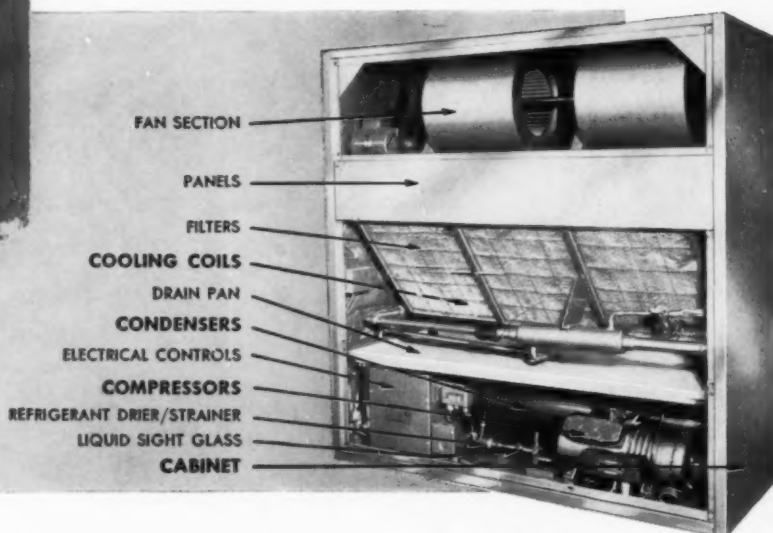
Continued on page 52



DUNHAM-BUSH 'PAC'



**Proves how to properly
package air conditioning**



Important to contractors and specifiers is peak performance of Dunham-Bush "PAC" Packaged Air Conditioners, achieved through pre-engineered major components. Other manufacturers, using components from diverse sources, must attempt to improvise balance. But Dunham-Bush manufactures and designs the motor compressor, condenser, evaporative coils and cabinet specifically for "PAC". This "one source-one responsibility" is evident in dependable operation and customer satisfaction.

"PAC" units are packaged for use, on-premises or remotely installed, in restaurants, stores, offices, clubs, banks, factories, depots or wherever high capacity, self-contained air conditioning units are required. Attractive finish harmonizes with decor practically anywhere.

"PAC" is available in 10, 15, 20, 25 and 30 h.p. capacities with either front or top discharge Air cooled or Water cooled models.

You'll want to have full details. Write today for Bulletin No. 6022 or request a copy from your nearby Dunham-Bush representative.

Dunham-Bush, Inc.

WEST HARTFORD 10 • CONNECTICUT • U. S. A.

DUNHAM-BUSH

AIR CONDITIONING • REFRIGERATION • HEATING • HEAT TRANSFER

WEST HARTFORD, CONNECTICUT • MICHIGAN CITY, INDIANA
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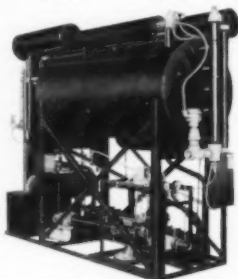


New Home Office of Battenfeld Grease and Oil Corporation, Inc., Kansas City, Mo., internationally known makers of custom lubricating products and waterproofing materials. Air-conditioned by Arkla Gas Absorption system. Architects: Monroe & Lefebvre. General Contractor: Bennett Construction Company.

Get low-cost heating and cooling! Specify GAS and ARKLA

After considering first cost, fuel cost and over-all operating cost, the Battenfeld Grease and Oil Corporation specified Arkla year 'round gas air conditioning. Their trouble-free gas absorption system practically runs itself.

Low pressure steam from a gas-fired boiler energizes the 25-ton Arkla Water Chiller, which automatically modulates to meet varying loads. Boiler capacity is put to use the year 'round . . . cooling in summer, heating in winter.



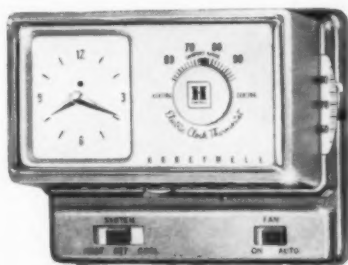
Arkla 25-ton gas absorption unit. Low operating costs. Fully automatic. Packaged construction. Easy installation. Long dependable service.

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Operation is quiet and frictionless, with no major moving parts. And the fuel is clean, fast, safe, dependable, economical gas.

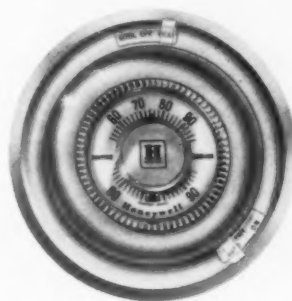
For trouble-free, low cost, year 'round air conditioning, specify *gas* and Arkla. Call your local gas company or write to Arkla Air Conditioning Corporation, General Sales Office, 812 Main St., Little Rock, Ark. American Gas Association

**FOR HEATING & COOLING
GAS IS GOOD BUSINESS!**



On every service call . . .

**SELL-UP to the Honeywell
Electric Clock Thermostat**



On every modernization job . . .

**SELL-UP to the Honeywell
Year-Round Thermostat**



For all quality new construction . . .

**SELL-UP to the Honeywell
Weather Station**



For all heat pump installations . . .

**SELL-UP to the Honeywell
Indoor-Outdoor Control System**

MAKE EVERY AIR CONDITIONING CALL PAY—

**Sell
UP!**

Honeywell

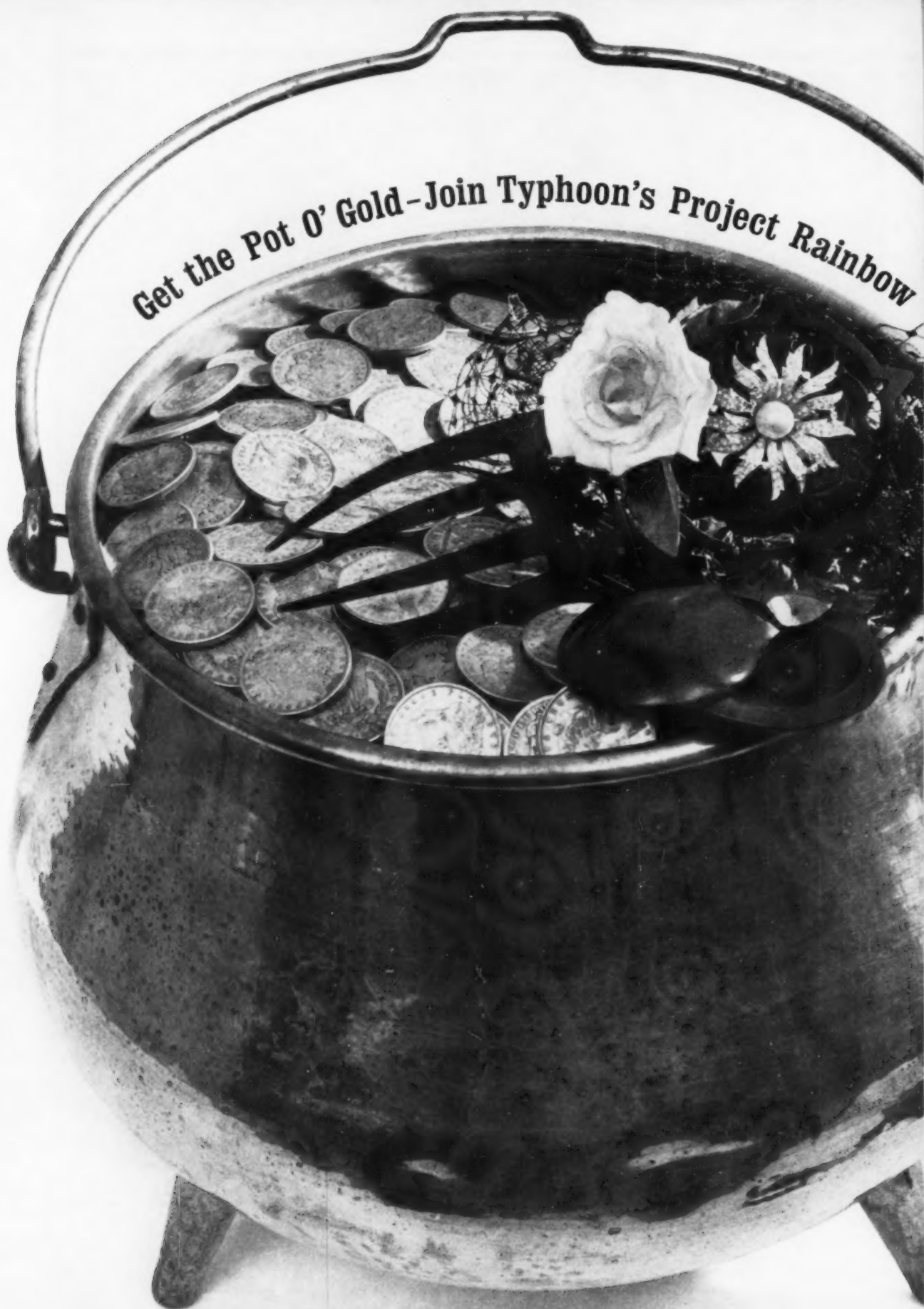


First in Control

SINCE 1885

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Get the Pot O' Gold - Join Typhoon's Project Rainbow



Project Rainbow has everything! Dazzle and depth are part of Typhoon's master sales plan to make this your most glittering season. Join the project. Take advantage of every Typhoon aid. Your pot o' gold at the end of this Rainbow would make even Midas blush! **Why Project Rainbow?** Typhoon's Master Plan sweeps across the entire sales horizon—product, sales development, advertising, promotion, sales training, finance, everything to conquer every problem! Dazzling new for '62—the Typhoon Rainbow line encompasses the widest range of air conditioners, heat pumps and furnaces in the industry. 24 new models over 1961 bring the Typhoon grand total to 197. There's a superior Typhoon unit for every need, every installation. You need never miss a sale! **Flexibility fans out like a Rainbow!** Typhoon alone is able to offer custom-built units at mass production prices. At little or no extra cost, you can furnish tailor-made equipment to fit the job. You get a competitive advantage...plus pot o' gold profits! **A whole file of financing plans.** Many payment plans make it easy to do business with Typhoon. Make it easy for your customers to pay, relieve you of financial strain. Help you take the big, profitable jobs. **Far-reaching sales help.** We go all-out for you! We offer materials to train your salesmen. Help plan your selling program locally. Do your selling for you nationally, to the major chains. **PLUS: a Pot O' Gold promotional program.** Typhoon has developed a profit-in-promotion formula that covers the promotional globe...leads to that pot o' gold for you. National advertising. Month-by-month local promotions. Specialized programs to sell every segment of business. Sales promotional tools, ideas, aids—professionally planned and executed. All colorfully shown in Typhoon's "Year 'Round Sales Promotion" Kit. **You reign in Spain!** Olé! Trips to glorious Spain just waiting to be won! Madrid, Toledo, El Escorial, here you come! You have, right through your peak selling season until June 30, 1962, to pile up the points that will jet you to Spain! **Jump at your golden opportunity...Join Project Rainbow!** From every angle, Typhoon distributors enjoy a real plus in product engineering, promotion, salesmanship, and profits. For more information about Project Rainbow and a new Reference Chart on the Complete Line, use the collect telegram, or call or write. TYPHOON AIR CONDITIONING DIVISION • DIVISION OF HUPP CORP. • 505 CARROLL ST., BROOKLYN 15, N. Y.



HUPP
Corporation

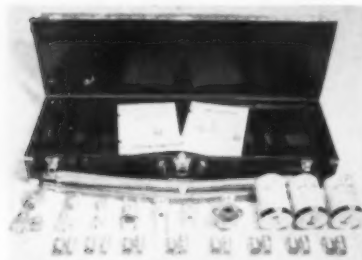
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WESTERN UNION		TELEGRAM	
Collect			
Typhoon Air Conditioning Division, Hupp Corporation 505 Carroll Street Brooklyn, New York			
Rush me full details on a Typhoon distributorship. (your name and address)			

Product DATA

System cleaner kits

Kit SCK-A contains fittings, hoses, and three catch-all cores; SCK-B includes these parts plus seven RSV-9 kits



and one RSV-5 kit. Extra material permits adaptation arrangements for switching from one size adapter to another without more soldering. All parts stored in black fiber board case. — *Sporlan Valve Co.*

circle 136 on reader service card

Temperature regulator

Is main valve (Type G2) for temperature regulation employing auxiliary source of steam, air, or water. For heat exchangers served by steam at pressures of 15 psi or less, controls at almost 0 pressure drop. The single-seated valve in sizes from 2 to 8" with 125-lb. flanges; double seat in sizes 10 and 12". Will throttle heater steam pressure into vacuum gage and resist action of wet steam. — *Spence Engineering Co., Inc.*

circle 137 on reader service card

Heating panel

"Heatrim" Model HH baseboard steel enclosure panel is 10" high and offers choice of two quick-response heating elements. Combination splitter-damper, which can be set at any interval, is standard equipment. Comes in five lengths — 3, 4, 5, 6, 8'. Built-in tube support eliminates use of wire hangers for connecting tubing. The 1-piece steel brackets snap into enclosure back to support heating elements and front panels. Packaged in three ways: completely assembled; bulk packages of three enclosures or six elements in each; enclosures and elements packaged one to a box. — *Plumbing & Heating Div., American-Standard.*

circle 138 on reader service card

Foaming machine

"Mark III-A, IV-A" rigid urethane foaming machine that offers reproducible ratio settings. To use, just dial accurate pounds-per-minute foam flow rate to eliminate component weighing and metering checks. "Mark V" spray or pour

head self-cleaning with dwell time up to four hours between shots. Lever movement changes from pour to spray and back. Can be equipped with revolution counter or automatic resetting cycle timer. Is 25 x 22 x 19" and weighs 175 lb. — *Chase Chemical Corp.*

circle 139 on reader service card

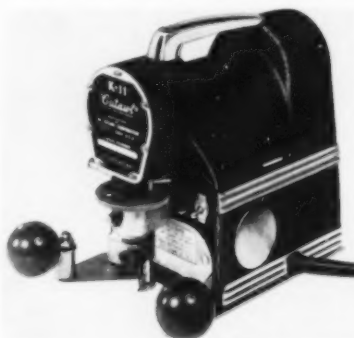
Curved blade grille

Aluminum blades extend beyond grille face and adjust individually to each job. Four different face designs for 1-, 2-, 3-, or 4-way air pattern control. Deflection changeable to meet seasonal needs of combined heating-cooling systems. Horizontal multi-louver valves in rear control air volume. System can be balanced at face of register by setting adjustable stop on operator handle to limit valve opening. Curved blade grilles also in all four face designs and four types of curved blade registers and grilles in eight sizes from 8 x 6" to 14 x 14". — *Air Control Products, Inc.*

circle 140 on reader service card

Cutting machine

"Cutawl" high-speed cutting machine. Has swivel head which permits 360-degree traverse of any pattern without changing directions. Makes own starting hole and will cut perfect circles small



as 3/8" dia. or up to 48" dia. with adjustable stroke and speed. Many cutting chisels and saws suitable for many materials. — *Cutawl Corp.*

circle 141 on reader service card

Metal cleaner

"Strip-All" concentrated liquid metal cleaner of carbon, sludge, varnish, paint, tar without harming metal. Non-flammable and non-explosive. In quart, 1½-gal. and 6-gal. kits of cleaner and immersion basket. Refills in quart, gallon, 5-gal. cans and drums. — *Stewart-Hall Chemical Corp.*

circle 142 on reader service card

Elapsed time meter

Type 236 elapsed time meter in 2½ and 3½" models for panel mounting and 2½" models for conduit case or portable stand applications. Instrument face has six digital counters measuring 0 to 99999.9 minutes or hours. Timing mechanisms enclosed in dust- and moisture-resistant cases. Electrical ratings include 120, 208, 240, and 480 v. for 50 or 60 cycles. — *General Electric Co.*

circle 143 on reader service card

Gas unit heater

Propeller fan-type gas-fired unit heater in 11 capacities from 25,000 to 300,000 Btu input for 115-v. operation or equipped with 24-v. transformer and fan-control for low voltage requirements. All controls within heater cabinet and has aluminized steel heat exchanger. For use where basic thermostatically-controlled heat required. — *Reznor Mfg. Co.*

circle 144 on reader service card

Capillary tube cleaner

"Lucas" cap tube cleaner that builds up hydraulic pressures in excess of 15,000 psi to clear capillary tube obstructions. Not necessary to remove tube from system or to lose refrigerant from system. Measures 8½" long and weighs 1½ lb. — *Southgate Tool & Die Co.*

circle 145 on reader service card

Resin gun

"Turvort" resin gun that mixes and sprays reactive resins and hardeners. When fed from metering system, gun mixes and dispenses resins and when equipped with spray tips will airless



spray multi-component resin materials. Eliminates solvent purging. Will handle urethane foam resin materials, liquid epoxy resins, liquid polyester resins. — *Leal Corp.*

circle 146 on reader service card

Continued on page 64



LARKIN MLT meat storage program saves money for retailers, makes money for refrigeration dealers

The retail meat industry is extremely enthusiastic about Larkin's new program for proper meat storage using the new LARKIN MLT System.

Astonishing graphic proof of the results obtained in two years of research and testing have sold this system to large chain and independent operations. Here's what the system does:

- CUTS MEAT SHRINKAGE
- REDUCES TRIMMING WASTES
- RETAINS BLOOM OF MEAT
- IMPROVES SHELF LIFE
- INCREASES PROFIT

The industry is buzzing. Stores are not only adopting the program for new construction but are also finding it profitable to convert existing systems.

LARKIN is ready to help you capitalize on this new source of revenue. Literature that tells the story, *sells your prospects*, is available to all LARKIN dealers.

Get in on the ground floor. See your wholesaler or write direct for Bulletin MLT-1061.



circle 27 on reader service card



Check the Refrigerant at a Glance...

with a **SPORLAN** *See-All*

*the Moisture and Liquid indicator with the single dot that shows how dry the refrigerant is...
and the full view sight glass that lets you see if the system is fully charged.*

Check these See-All advantages too...

One indicator with the same color change for Refrigerants 12, 22, 40 and 500. Color change points for each refrigerant reliably and accurately calibrated in parts per million of moisture content. Color changes are reversible and easily distinguished...dark green indicates dry, and bright yellow wet. The largest, crystal clear,

full view sight glass. Color indicator protected from discoloration and dirt in the system. Disassembly not required for installation. Double gasket at sight glass assures a positive leakproof joint. Double duty plastic cap keeps dirt and curiosity out. By-pass kits available for economical installation on large liquid lines.

**Get Peak Performance on every installation . . . make
Sporlan See-Alls a must on your next order. See your Sporlan Wholesaler and
ask him to show you the See-All line, or write for bulletin 70-10.**

**$\frac{3}{8}$ " and $1\frac{1}{8}$ " ODF
sweat models
now available**

SPORLAN VALVE COMPANY
7525 SUSSEX AVENUE ST. LOUIS 17, MISSOURI
TV

Export Department 85 Broad Street, New York 4, New York
circle 46 on reader service card

SO VERY, VERY QUIET



BOHN-AIRE ROOM CONDITIONERS

"Whisper-quiet" and personalized control of room comfort are outstanding features of BOHN-AIRE Room Conditioners.

Mr. George Wenthe, one of the owners of the Effingham (Ill.) Holiday Inn Motel, says: "We had Bohn-Aire Room Conditioners installed in every guest room of our new motel. Bohn-Aire units are whisper-quiet and completely efficient; we are happy to endorse them for installations in which *exceptionally quiet operation* and *individual room control* are desirable features."

Extra slim! Extra compact! For concealed mounting (as above) or for exposed mounting in attractive beige enameled cabinets. In capacities from 200 to 1200 C.F.M.; ideally suited to apartments, motels, hotels, offices, hospitals, and similar structures. Available in 7 sizes for vertical mounting and 5 sizes for horizontal mounting, all with 3-speed push-button control.



Write for **BOHN** Bulletin 250 containing full details

BOHN

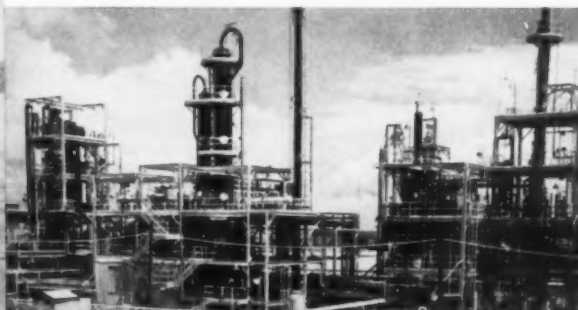
Buy the known line... the **BOHN** line
ALUMINUM & BRASS CORPORATION

Danville Division • Danville, Illinois

circle 12 on reader service card



Aluminum fluoride for West Coast aluminum smelters is produced at General Chemical's Bay Point, California, Works by treating aluminum salts with hydrofluoric acid. Hydrofluoric acid is also the basic raw material for fluorinated hydrocarbon refrigerants. As the nation's leading producer of "HF" General Chemical has earned a basic position in refrigerant manufacture.



At General Chemical's giant fluorochemical center in Baton Rouge, Louisiana, the knowledge and experience gained in working with fluorine and its compounds is applied to production of highest purity "Genetron" refrigerants. In addition, General manufactures "Genetron" in Danville, Ill., and at a new plant in Elizabeth, N. J., which has increased over-all capacity by more than one-third.

What does ALUMINUM have to do with **genetron[®]** super-dry refrigerants?

Quite a lot . . . for General Chemical is the nation's leading producer of aluminum fluoride—a fluorine compound which plays a vital role in modern methods of aluminum manufacture. The same technical "know-how" which has made General the leader in fluorochemical research and production makes "Genetron" refrigerants so outstanding throughout the air conditioning and refrigeration industry. *It makes sense to call on the*

leader in fluorine chemistry for fluorinated hydrocarbon refrigerants.

Behind "Genetron" Super-Dry Refrigerants is a research organization which is internationally recognized for its intensive work in fluorine chemistry.

Even more important to every user of "Genetron" Super-Dry Refrigerants are General Chemical's advanced manufacturing facilities, which have helped bring quality standards for

fluorinated hydrocarbon refrigerants to new "highs" of purity and dryness—a major contribution in itself.

"Genetron" Refrigerants are approved, accepted, *preferred* because they are *performance-proved*. Refrigeration engineers, contractors and servicemen endorse them. Wholesalers recommend them. Next time you order, insist on "Genetron" and be sure of the best! Available from wholesalers everywhere.



GENERAL CHEMICAL DIVISION

40 Rector Street, New York 6, N. Y.

Look to the leader in fluorine chemistry . . . insist on "Genetron".

circle 4 on reader service card

LET'S TALK *Business*

Take a look in the mirror, Mr. Contractor

WE RECENTLY PUBLISHED a study of our readership. Purpose of the study was to find out what products you use and what brands you prefer. We also wanted some facts regarding the men and equipment you employ on a daily basis. Filling in the questionnaire was a big job—our public thanks and a bouquet of roses to all of you who cooperated.

Two features of this profile stand out most prominently on first look. The average installing contractor-dealer handles a myriad of products — packages, parts and components — and has quite a payroll to support every month.

PROJECT

grade

More than 91% of our readers are engaged in some commercial, industrial or residential airconditioning activity, but only 46% identify themselves with a specific brand. Give this fact some thought. It may well be the major contributing cause of the depressed profits reflected by the financial statements at all levels in this industry.

The same lack of brand loyalty is reflected in all the products associated with airconditioning — whether cooling, heating, air handling or components. The one exception in the entire 52 product classifications is a control company which has done an outstanding job in getting contractor-dealer acceptance.

More than 71% of our readers are engaged in some commercial and industrial refrigeration. Only 44% of these contractor-dealers identify themselves with a specific brand.

Our reader survey further indicates that it takes an average of 18.8 field people to operate the average contractor-dealer organization. Sales engineers and estimators average 3.6 people. The jobs they get require an average 11.4 mechanics to install. Maintenance and repair requires an average of 3.8 servicemen per contractor organization. To keep them moving requires an average of 6.6 trucks per organization. Add the necessary clerical and management personnel and the total payroll becomes quite impressive.

It's a great business — the only missing ingredient is adequate profit.

Jack Robinson



During just four short days, the cream of the nation's purchasing influence will be looking at...and looking *for* the latest equipment produced by over 200 national air conditioning, heating and refrigeration manufacturers.

Surveys of past ARI Shows prove that 80% of those attending were directly responsible for purchasing. Of these, 40% were either ready to buy or were persuaded to make purchases for their companies during the Exposition. These are the selling days you can't afford to miss.

Here's your chance to meet and talk to industrial and commercial buyers, con-

circle 1 on reader service card

tractors, dealers, distributors, manufacturers, wholesalers, and engineers from every phase of this gigantic industry.

ARW, RACCA, RSES, ARI, NWAHACA and WACIA will all be helping to make this 12th National ARI Exposition the biggest and best in history. So, don't let this greatest sales opportunity pass you by... make it pass your booth by being**"on-the-spot"*! *Make space reservations now!*

CONTACT: George E. Mills, SHOW DIRECTOR
12TH NATIONAL EXPOSITION AIR
CONDITIONING, HEATING & REFRIGERA-
TION INDUSTRY • FEBRUARY 12-15, 1962
 1346 Connecticut Ave., N.W., Washington, D.C.
 COlumbia 5-0405

What type of control

for airconditioning systems?

■ ELECTRIC? ■ ELECTRONIC? ■ PNEUMATIC?



THERE'S NO PAT ANSWER to the problem of selecting the proper type of control for an airconditioning system.

Despite salesmen's claims, it makes little difference on most jobs whether you use electric, electronic, or pneumatic controls. If properly engineered and installed, any of the three will work well.

On many jobs the best solution is to combine electronic and pneumatic control, coupling the sensitive nerves of electronic sensors with the powerful muscles of pneumatic actuators by means of transducers. Such systems offer the combined benefits of speed, sensitivity, responsiveness, and power.

Each type of system — electric, electronic, pneumatic — has certain properties which make it preferable for some special applications.

- In hospital operating rooms, grain elevators, or any other explosive atmospheres, stick to pneumatic control. It eliminates the remote possibility of a low-voltage spark from electric or electronic components.

- Where long transmission lines are required, choose electric or electronic control. The pressure drop and time lag is apt to be too great with a pneumatic system.

- If remote monitoring or adjustment is desired, such as in a supermarket where the sensing device is located in the customer area but the manager wants to read and control the temperature from his office, electronic control is your best bet.

- Where temperature must be held within extremely close limits, as in a laboratory or gage room, the extremely rapid response of an electronic thermostat is what you need.

- Where two or more thermostats work together, with one resetting the other, the simplest and least expensive system is electronic.

If you're in any doubt as to which type of system will give you the best results on any particular job,

Continued on page 36

WHAT TYPE OF CONTROL?

consult the local representative of the manufacturer whose controls you plan to use. He's a specialist in this complex field.

WHAT YOU SHOULD KNOW ABOUT HOW CONTROL SYSTEMS WORK

How power is provided

The fundamental difference between pneumatic and electric or electronic systems is the power source. In a pneumatic system power is furnished by compressed air; the other two operate by electricity.

Power for electric or electronic controls is no problem. Electricity is available almost everywhere. Generally, 110-volt current is stepped down to 24 volts for control purposes, although some actuator motors run at 110 volts.

If you install a pneumatic control system, you must provide an air compressor to operate it. This adds to the cost of the job, but unless the airconditioning system is quite small, with no more than about eight controls, the increased expense is not enough to price a pneumatic system out of consideration.

It is not wise to use existing compressed air facilities for airconditioning control even if, as in some factories,

they are readily available. The factory's air compressor may be shut down at night or on weekends. Or the air it provides may not be clean enough. Because of extremely close tolerances and tiny orifices in pneumatic system components, the air used in a pneumatic control system must be free of moisture, oil, dirt, and other contaminants.

How power is transmitted

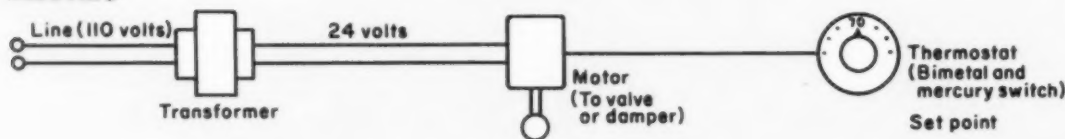
Electric and electronic control systems carry power to the thermostats and actuators by wires. The compressed air to operate a pneumatic system must be conducted through tubes.

It's quicker and cheaper to install electrical wiring than pneumatic tubing, unless you have to run the wires in conduit. Even then, on multiple runs a number of wires can be passed through one conduit. Each pneumatic line requires a separate run of tubing. Sometimes you can cut pneumatic installation costs, however, by using polyethylene, nylon, or polyvinyl chloride tubing instead of metal. But if you do, you must be sure to use proper fittings, provide ample support, and beware of running this tube through environmental conditions that might be detrimental to it.

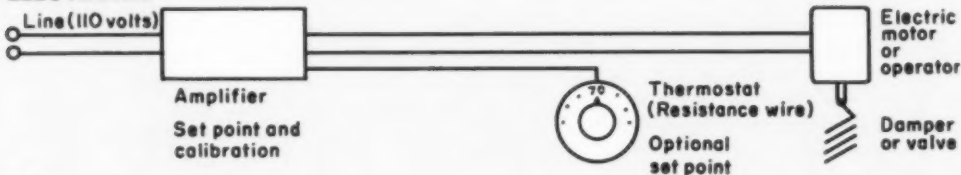
Long pneumatic lines, especially small-diameter ones, have a significant pressure drop, so you have to add pressure boosters. If the lines run through an area of severe temperature fluctuations, such as in a foundry, air pressures will change with temperatures, interfering with precise control.

HERE'S HOW CONTROL SYSTEMS OPERATE

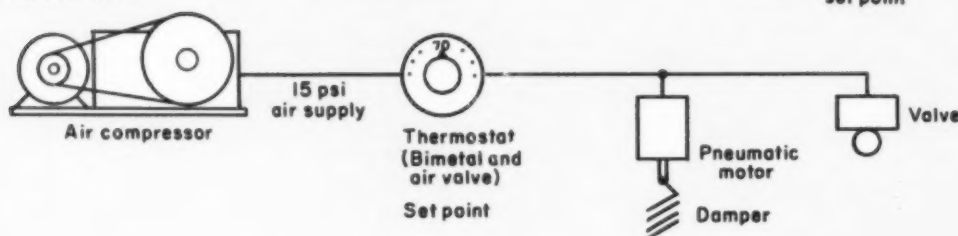
ELECTRIC



ELECTRONIC



PNEUMATIC





ELECTRONIC CONTROL OFFERS SPECIAL FEATURES. Electric typewriter (left) linked to control panel automatically logs key temperatures and pressures every 20 minutes. Compact viewing screen (above) lets operator instantly check any part of the system. Schematic drawings are rear-projected on the translucent screen from 35-mm slides. As each schematic is shown, the single set of pushbuttons is automatically locked into the circuit to control conditions in that part of the system.

Electric signals are sent almost instantaneously by wire. In pneumatic lines there's a time lag which can be significant in some applications.

How thermostats operate

Electric and pneumatic thermostats use a bimetal strip which warps or expands as the temperature changes. This action moves a mercury switch or other electrical switch to open or close a circuit in the electric thermostat, or vary the amount of air going through a nozzle in the pneumatic thermostat. In both cases there is lost motion, wear, and an appreciable time lag. But both electric and pneumatic thermostats are sensitive enough and fast enough for most applications.

An electronic thermostat is simplicity itself — just a length of fine wire. Resistance of the wire changes with temperature. There are no parts to move, corrode, or wear out. Because of its extremely low mass and lack of moving parts the electronic thermostat offers remarkably fast response and can measure minute variations in air temperature. This makes it ideal for use where precise temperature control is required.

By itself an electronic thermostat does not have a strong enough signal output to operate an actuator. Therefore its output (measured in millivolts) must be amplified before it can be put to work. Failure of vacuum tubes in the amplifier used to cause trouble, but the use of transistors in place of tubes has licked this problem.

How actuators operate

A pneumatic system uses pneumatic motors to operate valves and dampers. Electric and electronic systems use electric motors.

A pneumatic motor is smooth and powerful and has

a nearly infinite number of throttling positions, or steps. While an electric actuator motor doesn't have such a wide range of throttling positions, it does have enough to handle practically all airconditioning control requirements.

How to handle centralized control

Many airconditioning systems today feature a centralized control system, with information control and readout brought back to one point from an entire building or group of buildings. For such applications, electronic control is best.

You can provide centralized control pneumatically, with the aid of transducers, but it is both complicated and expensive. Pneumatic lines must be run from each sensing element back to the control center. This means substantially higher installation costs. Also, since every sensing device is connected to a separate pressure gage, a pneumatic control center for a large installation has a bewildering confusion of dials. This makes readout by the operator difficult and increases the possibility of error. Time lag or pressure drop between the controlled areas and the central panel can cause trouble. Calibration and adjustment is difficult.

An electronic control center uses wires to link the console with the various control elements. Readout is on a single gage or a numerical board. The panel is much smaller, and the system can be calibrated or adjusted right at the panel. ♦

This article was prepared with the cooperation of Minneapolis-Honeywell Regulator Co. Honeywell manufactures and markets all three types of controls—electric, electronic, and pneumatic.

The 5-year warranty—

JOSEPH B. ELLIOTT, *president, York Div., Borg-Warner Corp.*

BUSINESS BACKGROUND:

Elected president and general manager of York, 1960. Started with Radio Corp. of America in 1935 as phonograph record sales representative in Chicago. Named New England district manager, 1936; sales manager of RCA Victor radio, television and phonograph department, 1939. Joined Schick, Inc., as vice president of sales and advertising, 1944. Returned to RCA Victor in 1945 as general manager, home instrument department. Named vice president, consumer products. Left RCA to become president of Schick, 1954. Elected vice president of Raymond Rosen & Co. and president of Tele-Dynamics, Inc., 1957.

INDUSTRY ACTIVITIES:

Named a director of Air-Conditioning and Refrigeration Institute, 1960.



THE 5-YEAR WARRANTY IS A BAD DEAL for the manufacturer, the wholesaler, the contractor-dealer, and the consumer.

Certainly any reputable manufacturer should stand firmly back of his product with respect to defective materials and workmanship. But in too many instances the 5-year warranty is mishandled in the field. The consumer doesn't know what it means; and the salesman, in his eagerness for an order, does not make it clear that the 5-year warranty covers only the compressor. Often the consumer thinks his entire piece of equipment is warranted for 5 years.

Any analysis of repeat failures in the industry shows that many more compressors fail due to improper installation, improper cleaning, and failure of other components in the system, than fail as a result of some deficiency in the compressor itself.

The wide variation in compressor failure rates between factory charged and field charged units certainly indicates that in too many cases field charging is not done properly. This often causes the compressor to fail when the compressor is really not at fault.

On equipment with crankcase heaters the customer can ruin even a properly installed compressor simply by failing to follow the instructions that tell him to turn the heater on for a specified period of time before putting the unit in operation.

Under the 5-year warranty the industry leaves itself vulnerable to charges for the replacement of compressors and the acceptance of labor charge-backs caused by errors in the field over which the manufacturer has no control.

Manufacturers should design their products with the necessary capacity and protection, then price them at a normal profit that will assure customer satisfaction under normal service.

Our industry certainly should not extend the warranty of a compressor beyond that of the compressor manufacturer's guarantee, which is 1 year.

The 5-year warranty as it now stands makes it possible for a user to get a new compressor even if the old one fails after 4 years and 11 months of satisfactory service. In effect this means that the industry is offering almost a 10-year warranty. This policy can't help but increase costs to the entire industry. Somebody has to pay the bill. And almost invariably it's the consumer.

Here's my recommendation to help cure the industry's 5-year-warranty ills. If manufacturers deem it advisable to continue the 5-year warranty, then this warranty certainly should be set up on a pro rata basis. In this way the user would pay for whatever number of months or years of satisfactory service the compressor delivers.

what's wrong with it?

GEORGE T. HOWE, *president, Accurate Heating & Cooling Corp.*



NOBODY BENEFITS FROM THE 5-YEAR WARRANTY. It ought to be dropped. Actually it was started as a sales gimmick by one manufacturer. Other manufacturers adopted it to keep in step with the competition. Now most of them realize they have a tiger by the tail, and they're afraid to let go.

The 5-year warranty is a headache for everybody in the business. But most important of all, it's a gross injustice to the customer — and that's the man the contractor's worried about, because he's the one on whom the contractor's business depends.

In the first place, most warranties are worded so that the customer has a tough time figuring out what protection it gives him, even if he takes time to read it. And too often the contractor's salesmen, afraid of dampening the prospects for a sale, don't make any real attempt to clarify the warranty. Then the customer gets miffed at the contractor if the system fails and the misunderstanding comes to light.

What's more, the customer pays for the extended 4-year warranty in the price of the product, whether he knows it or not and whether he wants this protection or not.

The contractors have caused a lot of their own grief in this matter of the 5-year warranty, because too many of them don't know how to install a hermetic system properly, or how to clean the system properly before replacing the condensing unit in case of burnout. This invariably means repeated failures of the same system.

There are proper ways of cleaning a system and replacing the hermetic condensing unit, but they take time and they are costly. On one recent job we spent 21 man hours replacing a 7½-ton unit. The manufacturer's labor allowance was 5 hours. We absorbed the difference because the unit was still in warranty. We could have done the job quicker and more cheaply, but we insisted on doing it right so that we would be able to keep the customer's future business.

I think manufacturers should go back to a 1-year warranty. If the customer wants more protection he can buy insurance. Then I think the manufacturers should set up rigid standards for installation and replacement practices. They should make sure their contractor-dealers are familiar with these standards and follow them. They should adjust their labor allowances upward to compensate the contractor adequately for doing a proper job. And finally, they should refuse to honor units sent back to them under warranty when examination reveals the failure to be due to faulty installation or replacement. ♦

BUSINESS BACKGROUND:

President, Accurate Heating & Cooling Corp., prominent air-conditioning and refrigeration contracting firm in Chicago, Ill. He founded this company in 1935 as a 1-man operation specializing in household refrigeration service and built it into a million-dollar-a-year business employing 35 to 60 people.

INDUSTRY ACTIVITIES:

Participated in the formation of both the Refrigeration and Airconditioning Contractors Association of Chicago, and of RACCA-National. Served as first secretary-treasurer of Chicago group, 1947-48. Elected director, 1949; president, 1950 and 1955. Elected treasurer, RACCA-National, 1952; president, 1953-54; chairman, manufacturer-wholesaler relations committee, 1958-59.

**This dealer sells
the same piece
of equipment
again . . .
and again . . .
and
again**

HAVE YOU EVER SOLD the same piece of refrigeration equipment 15 times? A Cleveland, Ohio, distributor has done it — and made a solid profit each time.

The sales of Perchan & Co. have soared in the 27 years since its founding largely because it specializes in selling reconditioned commercial refrigeration units and fixtures.

The company buys the equipment at bankruptcy sales, at auctions, and from merchants who are going out of business or who are expanding. Most of the leads come from salesmen who call on these retailers: the milkman, the breadman, the serviceman. They know that Perchan is one of the few firms in Ohio that buys used equipment and that takes a trade-in. They tip off Perchan, who then usually adds another customer to its current list of 1200.

Here are three good examples of how the company often makes a profit several times on the same piece of equipment:

► An ice cream cabinet bought in 1934 by Perchan was seen again last March for the 15th time, and they expect to see it again.

► A small meat case sold for \$525 in 1938. Now it's back for the sixth time and it is expected to bring about \$500 after reconditioning.

► The same bottle cooler has been sold 11 times in 13 years. Eight times it came back as a trade-in

THIS FOOD CASE arrives at Perchan's for resale



. . . where it's inspected before reconditioning



and three times its owner went out of business. In 1947 Perchan sold it new for \$360. Last year, it sold for \$340 after its third complete reconditioning.

Harry Perchan started the business in 1934 with \$50 and the hunch that people want a good product at the least cost and don't care whether it's new. He was a good hunch player because today his son, John, directs a \$250,000-a-year business. It's also a tribute to the manufacturers that the units stand up to hard wear so well over the years.

About 70% of the company's sales is used equipment — an unusual phase of a business in which trade-ins are often more of a headache than a profit-builder.

The firm sells and stocks used restaurant, bar, and soda fountain equipment, compressors, cash registers, produce coolers, food cases, scales, slicers, small air-conditioning packages: just about anything the store owner needs. Its 18,000-sq.ft. warehouse and 8500-sq.ft. main building bulge with thousands of items from glasses to bar stools, from icemakers to walk-in coolers.

Suppose a store owner wants a reconditioned unit and he calls Perchan & Co. They ask if he has an old piece of equipment as a trade-in. If he doesn't, they ask for a small down payment and finance the balance by note or on the meter plan, unless the customer pays the full amount in cash. Old customers

don't have to make down payments, if their credit is good with Perchan.

If the customer doesn't want a meter, Perchan does its own financing, discounting the chattel mortgage. About 50% of the sales are financed this way, about 45% are by the meter plan, and about 5% of the business is cash.

When you buy a new unit and have a Perchan-bought unit as a trade-in, the company allows you the full purchase price of your old unit on the new one, less delivery and other minor costs.

When a used unit arrives at Perchan's, four mechanics recondition it. They metalwork the worn case, replace worn parts, spray and refinish its exterior, and inspect coils, valves, controls, and wiring.

The company estimates it sells its reconditioned units at less than half the price of a new piece of equipment. Harry Perchan illustrates:

"A supermarket owner wanted us to fully equip his store with reconditioned equipment. We installed the following units: two walk-ins; two frozen food cases; one self-serve and one service meat case; one poultry case; two scales, slicers, and meat blocks; one cash register; and one ice flaker.

"Total cost to the customer for this complete refrigeration setup was a little over \$7000. That store owner would have paid about \$20,000 for the same equipment if he had bought it new." ♦

... and a customer buys it from John Perchan (right)



... only to have the same case return again later.





FOIL INSULATION cuts warehouse cooling costs

ALUMINUM FOIL goes hand in hand with airconditioning to keep candy cool and cut costs at Great Southwest Warehouses, Inc. in Dallas, Texas. Candy is stored there in a specially-designed cooling room which must be kept at a constant 72 F to prevent spoilage.

This foil insulation not only helps provide correct temperature control, but cuts airconditioning needs in half.

"The secret of a tasty candy bar is the constant temperature at which it is shipped and stored," said R. E. Abernathy, Jr., GSW vice president. "Even a small change in temperature can ruin the flavor of chocolate candy."

Requirements cut in half

Airconditioning contractors had told Abernathy that 60 tons of cooling would be needed. With foil insulation, requirements for the warehouse could be reduced to 30 tons.

Great Southwest officials tested several insulating materials before selecting "Alfol," made by Reflectal Corp., a subsidiary of Borg-Warner Corp.

The insulation makes it possible to maintain 72 F temperatures in the storage room even when it's

sizzling outside, without imposing a heavy workload on the cooling system," Abernathy stressed.

Radiant heat problem eliminated

A foil insulating blanket composed of three layers of aluminum with the bottom one laminated to asphalt-treated kraft paper was applied to the ceiling of the 10,000-sq.ft. cooling room.

A blanket of one layer of foil plus a kraft-and-duplex vapor-proof backing was used on the side walls.

About 17,000-sq.ft. of aluminum foil was used in the installation.

Because of its high reflectivity, foil insulation causes outside heat to bounce back, thereby keeping inside temperatures constant.

Air spaces in the foil blanket blocks heat that normally would be transferred by conduction. This eliminates the problem of radiant heat which usually accounts for as much as 80% of all heat loss across un-insulated wall spaces and ceilings.

The warehouse received two extra advantages by using the foil. First, it reflects light, improving working conditions in the room. Second, its attractive appearance saved the company the expense of constructing a permanent ceiling. ♦

"PLUS FEATURES HELP SELL THE ALL NEW . . ."



automatic

ICE CUBERS

and automatic

ICE CHIPPERS



"Model CU-200 Cuber"



FOR CHIPS

Model CH 550
550 lbs. daily
"chip harvest"
500 lbs. bin
storage capacity
Model CH 250
250 lbs. daily
"chip harvest"
300 lbs. bin
storage capacity

FOR CUBES

Model CU 200
200 lbs. daily
"cube harvest"
250 lbs. bin
storage capacity
Model CH 400
400 lbs. daily
"cube harvest"
450 lbs. bin
storage capacity

● Produce diamond-bright ice chips and clear, solid cubes — shaped as a cube should be. (Cubes last longer — displace more liquid)

● Store MORE than a full day's ice production, yet take a modest amount of floor space. (You get all the ice you need even at "peak-usage periods").

● Handsome cabinetry is suitable for use in dining or other customer areas. Five non-fading fiberglass colors make it easy to match with existing decor. Rugged yet lightweight fiberglass cabinetry can't rust or corrode — lasts a lifetime. Both interiors and exteriors have contoured corner-less edges.

● Quiet operation and minimum maintenance. Improved and simplified design means fewer operating parts. (Refrigeration components are manufactured by the recognized leaders of the industry). Easy to operate.

● Easy-access front panel completely exposes mechanical compartment and principal components for servicing. Easy to install. Ice maker is installed on top of matching storage bin. Insulating Inert Foam between walls of cabinet locks in sound and temperature. Heavy-duty compressor. Water or air-cooled condenser. F12 refrigerant.

Clip out and mail today

WE INVITE COMPARISON — dollar for dollar and feature for feature. The new Kodiak line is ahead in design — easy to sell, easy to install and easy to maintain. Distributorships in some areas are still available. For complete information without obligation, write:

KODIAK, INC.

Telephone: CA 7-8354

297 COMMERCIAL STREET ST. PAUL 6, MINNESOTA



KODIAK, INC., 297 Commercial Street, St. Paul 6, Minnesota

Please send me complete details about Kodiak.

Name _____

Company _____

City _____

State _____

Type of Business _____

circle 23 on reader service card

RANCO IMPROVED "O" SERIES CONTROLS



Higher Electrical Capacity

Service Men, take note. Ranco "O" Series commercial refrigeration and air conditioning controls have a stepped-up, approved electrical rating — now 16 amps. full load, 96 amps. locked rotor with 115 volts a.c. and 10 amps. full load, 60 amps. locked rotor with 230 volts a.c.

You'll notice a restyled cover, too. Cover and mounting brackets are now finished in a durable, wrinkled black paint. Type and code numbers are stamped on top and back of control frame for sure identification in case nameplate is detached. Increased electrical ratings are listed on insulator board inside cover. New nameplates do not carry type and code numbers or ratings.

Ranco "O" Series Controls are now better than ever in performance, easier than ever to identify.

"O" Series Controls for every installation

010-1401 (shown) is a low-pressure control opening on drop in pressure. Other standard "O" Controls are low pressure, high pressure, dual pressure, dual temperature models with variations according to fixed and adjustable differentials, operation on rise or drop in temperature or pressure, with or without manual reset, cut-out and cut-in ranges, capillary tubes. Gives you replacement controls for general applications in commercial air conditioning and refrigeration installations and special applications in ice cube machines, milk coolers, signal circuits, wide-cycle defrost, and others.



Ranco[®]
INCORPORATED
COLUMBUS 1, OHIO



Service Men! Get this book!—Ranco Book No. 1660 lists "O" Series, and nearly 5000 other Ranco replacement control applications. See your Ranco wholesaler for a copy (not available from factory).

circle 39 on reader service card

Service Clinic FOR CONTRACTORS

A MONTHLY TRAINING GUIDE AND REFERENCE FILE FOR YOUR SERVICE DEPARTMENT

How to clean electric motors

MR. CONTRACTOR:

Watch for the Service Clinic every month. Its buff-colored pages make it easy to find. Pull out the complete section and pass it on to your installation and service department. The material in this section is especially selected, written, and edited to help these men do a better job.

FRED W. J. LIU, PHD.
director of research, Lester Laboratories, Inc.

DIRT IS THE VILLIAN in many cases of motor failure, unsatisfactory operation of motors and electrical equipment, and high maintenance costs.

The answer lies in a carefully planned cleaning program using methods and materials specifically suited for this purpose.

If you've been in the service business any time at all you know that open-type motors readily accumulate oily and greasy soils, lint, dust, and dirt. And you realize that these foreign materials cause motors to overheat, reduce their normal life expectancy, and create fire hazards.

Even so-called "totally enclosed" motors usually depend for cooling upon air drawn into the motor by the fan, and all air contains certain amounts of soil particles.

So it's obvious that all motors except those that are hermetically sealed should be cleaned as part of every preventive maintenance program. The cost of cleaning is small compared to the cost of rewinding, rebuilding, or replacing motors that have failed.

Many times you will be called upon to clean motors while they are still hooked up in the refrigeration or airconditioning system. This is known as line service cleaning. On other jobs you will be able to take the motor out of service and remove it to the shop for cleaning. In either case it is very important that you use the right kind of cleaning solvent.

Continued on page 46

SERVICE CLINIC FOR CONTRACTORS

The solvent you select should have these characteristics:

- It should be dielectric (this means non-conductive).
- It should have rapid grease solvent action.
- It should evaporate completely at a satisfactory rate, leaving no oily film or residue of any kind.
- It should be harmless to insulation, wiring, and metals.
- It should be non-toxic.
- It should be approved from a fire hazard standpoint by a recognized testing laboratory.

Unless the solvent you use is non-conductive it may short the motor or other equipment, particularly if you use it for line service cleaning where the equipment may be put back into operation before the solvent has completely evaporated.

The ability of the solvent to rapidly penetrate and dissolve oil and grease is essential, because most of the soil you find on motors is of an oily nature or is stuck to the equipment by an oily binder.

Unless the solvent is harmless to wiring, insulation, and metals in the motor or other equipment it can cause more damage than it does good. Cleaners with too strong action will damage rubber and enamel insulation and cause motor or equipment failure.

The purpose of cleaning is to remove any foreign matter from the motor or electrical equipment, so the solvent must evaporate completely without leaving any deposit, oily or otherwise. Solvents that leave an oily residue may destroy motor components. Solvents that evaporate too rapidly do not permit a good cleaning job, and induce moisture condensation within the field windings.

You should use utmost care to select a solvent that is safe to use and store on the job or in the shop. Your life may depend upon it. Insist that the solvent you use be listed by an independent testing laboratory such as Underwriters' Laboratories, and be sure to check its maximum allowable vapor concentration. This concentration will vary from a toxic level of 25

parts per million (ppm) of air for carbon tetrachloride to 500 ppm, which is the accepted safe level for this type of solvent.

You can't put too much emphasis on this safety factor when selecting a solvent. Carbon tetrachloride was once used quite widely for this purpose, but most industries have abandoned it as a cleaning solvent because of its extreme toxicity. The vapor from one cupful in a poorly ventilated area has been known to cause the death of the user.

Methods used to clean electric motors and other electrical equipment such as switch panels, relays, starters, and generators, vary with the size of the equipment and its cleaning requirements.

To perform line service cleaning and the cleaning of motors and other equipment too large to handle easily, your best bet is spray cleaning. Use a spray device that delivers the solvent without mixing it with air. Don't let pressure on the spray equipment exceed 50-60 psi, or you may harm wiring or delicate components. Apply sufficient solvent to thoroughly wet all parts of the motor or equipment.

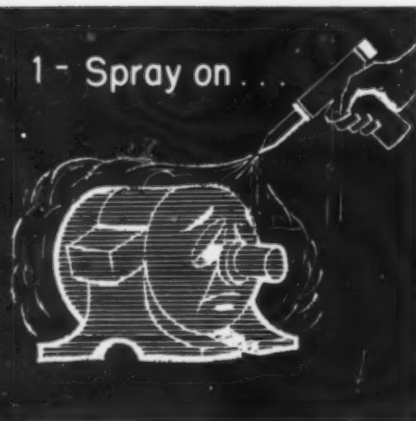
Then use an air blast — again not exceeding 50-60 psi — to remove the excess solvent and the dissolved grease, oil, and soil. Don't use the air blast to completely dry a motor. If you let the last coat of solvent dry normally you will prevent moisture penetration of the motor windings.

Normally you will perform out-of-service cleaning in the shop or some central location where you can disassemble the motor. Clean the end bells and frame by dipping and soaking them in a tank of the solvent. Clean the rest of the motor by the spray method.

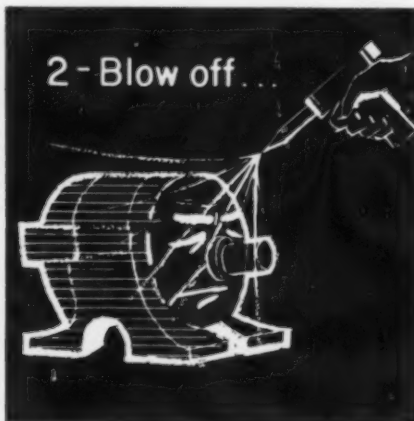
After you remove the end bells and frame from the tank, blow them with air, paying particular attention to pockets where the solvent may be trapped.

Proper preventive maintenance using a safe and effective solvent for periodic cleaning of electric motors and other electrical equipment will greatly reduce equipment failures, unsatisfactory operation, and high maintenance cost. You should recognize these facts and establish a regular cleaning program for all electrical equipment for which you are responsible. If you take care to select the proper solvent, and use it in the right way, you will find that such a program can be thorough, safe and economical. ♦

1 - Spray on



2 - Blow off



3 - Motor clean !



Applications **MANUAL**

ARTHUR H. FARR, consulting editor, airconditioning

Backyard swimming pools — a growing market for heat pumps

THE BOOM IN BACKYARD SWIMMING POOLS may not mean much to you, unless you have one of your own. But if you sell heat pumps, it should.

The year-round use of swimming pools in mild climate areas requires heating of the pool during a portion of the year. And wherever there's a need for swimming pool heating there's a prospect for a heat pump installation. The airconditioning contractor who's alert to this fact can build a profitable plus business by designing, selling and installing such jobs.

Until recently swimming pools have been heated by conventional water heaters using hydrocarbon fuels. Now, however, it is not at all uncommon, particularly in the west and southwest, to find a residential pool equipped with canvas wind breaks, infra-red pedestal heaters around the pool area, and a heat pump water heater to maintain pool water temperature at a comfortable level.

Initial cost of a heat pump pool heater is far greater

than that of a conventional heater, but in the long run it can prove more economical. The average conventional pool heater has to be replaced every couple of seasons or so because of the deteriorating effect of chlorine and other chemicals in the pool water. With a water circuit made of Admiralty metal, which resists such corrosion, a good heat pump pool heater should last the life of the pool.

How about cutting equipment costs by using the same heat pump to heat the pool and aircondition the house? Don't try it. This sort of dual application just doesn't make sense. The basic problem is that both the house and the pool need heat at the same time, so there's no chance to utilize off-peak load.

Designing heat pump systems for swimming pool heating is tricky. I have seen enough bad jobs to make this very evident. Toughest problem is calculating

Continued on page 48

HEAT LOSS FROM WATER SURFACE (at 70% relative humidity)

*Courtesy of Air Conditioning,
Heating & Ventilating*

WATER TEMP. (deg. F)	WIND VELOCITY (fps)							
	0	0.5	1	2	5	10	20	50
HEAT LOSS (Btuh/sq.ft.)								
Air temperature 80 F								
80	17	34	40	49	66	106	185	330
Air temperature 60 F								
60	7	18	21	26	34	56	95	180
70	33	52	60	78	105	170	270	580
80	78	110	125	150	210	315	510	1050
Air temperature 40 F								
60	58	75	86	94	130	190	310	620
70	90	115	130	150	210	300	490	970
80	135	170	195	225	310	450	720	1460

the heat loss of the pool during periods when water heating is required. Here's how to go about it.

You can figure heat loss through the bottom and sides of the pool quite readily using conventional methods, but figuring surface loss is a difficult mathematical calculation involving component losses by radiation, convection, and evaporation.

The accompanying table greatly simplifies this calculation by showing the heat loss from water surface for an outdoor relative humidity of 70% and for various water temperatures, air temperatures, and wind velocities.

You can best grasp the effect of wind in cooling a pool by noting on this table the heat loss per square foot of pool surface when the temperature of both outdoor air and pool water is 80 F. Even when there is no wind at all, the loss is 17 Btuh/sq. ft. This represents evaporation to the 70% rh surrounding air.

When wind velocity increases to a nominal 7 mph, or roughly 10 feet per second (fps), the heat loss from the water surface jumps to 106 Btuh/sq.ft. This shows plainly why you must install a windbrake around the pool before you even start thinking about heating the water.

The most common errors I have seen in applications of this type involve either oversizing or undersizing the heat pump, generally the latter. This is quite likely due to a lack of understanding by the designing engineer of the effect of wind in surface cooling.

To make the necessary calculations more readily understandable, let's take a typical swimming pool problem and work it through from the beginning to the selection of the proper heat pump to do a good heating job.

PROBLEM: Heat a residential swimming pool 15' wide, 30' long, and varying in depth from 3 to 8'. Location is Los Angeles, Calif. Pool water is to be maintained at 70 F.

SOLUTION: The *Heating, Ventilating, Air Conditioning Guide* shows that Los Angeles experiences an average wind of 6.4 mph during December, January, and February, and that a dry bulb temperature as low as 44 F can be expected only once in 5 years. This indicates that it would be logical to design for an ambient temperature of 50 F.

The *Guide* has a table headed "Below Grade Heat Loss for Basement Walls and Floors" which shows for 60 F ground water temperature a heat loss of 1.0 Btu/sq.ft. for floors and double that for walls below grade. The Los Angeles ground water temperature is 67 F, which is so close to the 70 F pool temperature desired that it's safe to ignore any losses through the walls and bottom of the pool.

Next step is to calculate heat loss from the surface of the pool water.

Find total surface in square feet:

$$15' \text{ width} \times 30' \text{ length} = 450 \text{ sq.ft. surface}$$

Find wind velocity in feet per second:

$$\frac{6.4 \text{ mph} \times 5280}{3600} = 9.4 \text{ fps}$$

The heat loss table reproduced with this article does not list any values for 50 F ambient, so it is necessary to interpolate between 40 and 60 F. At 40 F air temperature, 10 fps wind velocity, and 70 F water temperature, the table shows surface loss is 300 Btuh/sq.ft. At 60 F air temperature, 10 fps wind velocity, and 70 F water temperature, surface loss is 170 Btuh/sq.ft.

To find surface heat loss at 50 F ambient, with the same wind velocity and water temperature factors:

$$\frac{300 + 170}{2} = 235 \text{ Btuh/sq.ft.}$$

Now find total heat loss:

$$450 \text{ sq.ft.} \times 235 \text{ Btuh/sq.ft.} = 105,750 \text{ Btuh}$$

Next step is to determine equipment selection. A typical 7½-hp water-to-water heat pump (corrected for 67 F well water supply (has a heating capacity of 111,500 Btuh, which obviously would be adequate to handle the problem pool.

If well water is not available, an air-to-water heat pump can be used. Capacity of a typical 7½-hp air-source heat pump with 50 F outside air over the coil is 101,500 Btuh. Although this is a little under the design load, it probably would be adequate to do a satisfactory job.

Before making final equipment selection, investigate canvas windbrakes to see if wind velocity can be dropped enough to permit use of a 5-hp heat pump.

Remember that a heat pump has poor recovery performance. If the owner drains the pool frequently to clean it, then refills it with cold water, warn him that the heat pump will be slow in bringing the pool back up to design temperature. ♦



If you're reading this page . . .

you must be in the refrigeration and airconditioning business, And if you're in the refrigeration and airconditioning business, there'll be something for you at Los Angeles next February . . . something that will help you run your business better and more profitably. We'll be there. Will you?



Series 219 without external range adjustment.



Series 219 space thermostat with range adjustment knob and integral air bulb.



Series 219 with external range adjustment.

LOOK WHAT'S NEW IN REFRIGERATION TEMPERATURE CONTROLS



Series 239 has both external range and differential adjustment.

**Now! Compact size,
highly accurate
repeat performance,
plus other new
sales features!**

Here's a new line of small, compact, Penn refrigeration temperature controls which has a *wider range* of applications with *fewer models*. The Series 219 has a fixed differential while the Series 239 differential is adjustable. Rated at 16 Amps., these models feature extremely close differential, precision "repeat" accuracy, and are not affected by barometric pressure or cross ambient temperature problems. Extra features include built-in conduit fitting on Series 219, visible linear scale and small bulb size. Closed-tank fittings and bulb wells as well as built-in compensation for ambient temperature are also available. Learn more about these controls . . . write for Bulletin 3270.

PENN CONTROLS, INC. Goshen, Indiana

EXPORT DIVISION: 27 E. 38th ST., NEW YORK, N. Y.

AUTOMATIC CONTROLS FOR HEATING, REFRIGERATION, AIR CONDITIONING, APPLIANCES, PUMPS, AIR COMPRESSORS, ENGINES

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Contractor-Dealer **ACTIVITIES**

Chicago RACCA chapter starts new serviceman's training school

First sessions of a new school for airconditioning, refrigeration, and heating servicemen are underway at Chicago's Allied School of Mechanical Trades, Inc. The training program was developed by the Chicago chapter of Refrigeration and Air Conditioning Contractors Association as an outgrowth of the service class started in 1954.

The new school is the result of an agreement between the Chicago chapter and Allied School to cooperate on special classes to turn out well-trained, qualified servicemen. Allied School has set aside space in which RACCA-Chicago has installed all sorts of training equipment furnished by nearly 100 airconditioning, refrigeration, heating, and ventilating manufacturers and suppliers. The equipment includes full-scale operating compressors, self-contained airconditioners, water chillers, cooling towers, air-cooled condensers, boilers, oil and gas burners, heat pumps, and many special training devices. The agreement also calls for Allied School to furnish instructors.



RACCA-CHICAGO and Allied School officials sign the contract for the 1961-62 term of RACCA's Servicemen's Training School. Seated (left to right): Guido F. Restagno, chairman, RACCA School committee; Harry Lebeson, president, Allied School of Mechanical Trades, Inc.; Daniel M. Brown, president, RACCA-Chicago; Standing: Myer S. Axelrod, W. J. Monkerud, R. B. English, RACCA school committee.

Currently four courses are being offered:

- ▶ Fundamentals of heat transfer; shop and field practices.
- ▶ Packaged equipment; introduction to trouble shooting work.
- ▶ Elements of dry and wet heating systems; heating controls.
- ▶ Advanced trouble shooting program.

Chicago RACCA's new Servicemen's Training Program is designed specifically to overcome the scarcity of well-trained industry service people. The school is located at 1338 S. Michigan Ave.

California passes licensing bill

Four years' effort by the Southern California Chapter and State Council of Refrigeration and Air Conditioning Contractors Association resulted in California's new law to license refrigeration and air-conditioning contractors.

Initiated by the RACCA groups in 1957, the law was signed recently by Governor Pat Brown. It requires refrigeration and air-conditioning contractors, whatever their specialty, to be licensed by the California Contractors' State License Board. They will be subject to the same rules and regulations as other types of licensed contractors.

Work less than \$100 will be exempt from the provision.

New members sought by RACCA-National

A "Three To One" campaign to upgrade and update RACCA-National's membership has been outlined by Warren Farr, chairman of the membership committee. Every member is urged to recruit a new member and three prospects.

Class B members (local associa-

tions) are asked to get new members into their locals and report the additions to RACCA-National so they can benefit from the national association activities.

The drive is also geared to increase Class A membership (members from towns and cities which do not have a local RACCA group).

L. A. firm opens San Diego branch

A specially designed branch office-warehouse has been opened by Air Conditioning Supply Co. in San Diego, Calif. Main office



of the firm is in Los Angeles. The new branch building is in a fast growing industrial area on Highway 101 and the Morena freeway.

Contracting firm opens

Robert R. Fish has established a new company in Brookline, Mass., to sell and install all types of commercial and industrial refrigeration and airconditioning equipment. Associated with him are Leo Henry, engineering and purchasing; Ralph Coppola, construction and installation; and Edward Callahan, office manager.

RACCA committee plans newsletter

Dan Brown, chairman of RACCA-National's Manufacturers and Wholesalers Trade Relations Committee, has announced that members will receive a news bulletin periodically to keep them informed on the activities of this committee. The first report deals with York Div.'s relationships with RACCA-National and its members.

how do distributors rate **NOR-LAKE** refrigeration products?

“NOR-LAKE GETS A's IN SCHOOL SALES!”



... says J. A. Kolbe, of John G. Kolbe Company, Richmond, Va.

“It's much easier to sell dollar-conscious schools when our product has both variety and quality—like NOR-LAKE. NOR-LAKE'S quality line means selling flexibility—allows us to compete for sales effectively in both institutional and commercial fields.

“Then too, NOR-LAKE'S ‘Fine-Line’ appearance is backed up by rugged design based on years of refrigeration experience. Our success in the school market—where NOR-LAKE'S ruggedness and reliability is so important—has returned double dividends to us. Our experience shows that NOR-LAKE means savings in time, trouble and service calls. We get satisfied customers (the most important sales asset for any dealer).

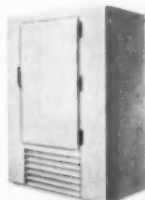
“Now you know why we feel NOR-LAKE products rate A's for quality sales. Naturally Kolbe Company is proud to display and sell NOR-LAKE'S line of refrigeration products, and we expect to continue this pleasant association for many more years.”

**John G. Kolbe Company is one of the South's largest suppliers of equipment for schools, hotels, and restaurants.*

NOR-LAKE'S “FINE-LINE” IS A FULL LINE



biological refrigerators



refrigerators



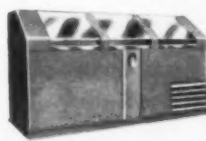
walk-ins



freezer-refrigerator combinations



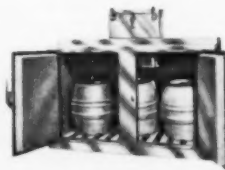
freezers



bottle coolers



ice cube makers
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direct draws

Write today for information concerning NOR-LAKE sales opportunities in your area.



NOR-LAKE, inc.
Second & Elm,
Hudson, Wisconsin,
Dept. 205

IT COSTS
LESS
TO USE
THE
BEST!

PLS



For your convenience:
available in handy
1-lb. brush top cans.

Approved
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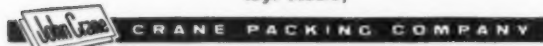
1. Takes less PLS to give a perfect seal.

2. One compound for many services: water...oil...gas... steam...chemicals...petroleum products...refrigerants—low and high pressures.

3. Never washes out—one application lasts forever.

4. Never hardens: joints may be easily broken after years of service—no damaged connections.

Prove it to yourself. Send for a free sample. Crane Packing Company, 6455 Oakton St., Morton Grove, Ill. (Chicago Suburb)



USEFUL Literature

Continued from page 22

CAPACITOR START MOTOR. Bulletin 300 describes electrical and operating characteristics of capacitor start induction run single-phase motors for high or medium starting torque applications. The product's horsepower, voltages, frequency, speeds and duty are provided. There's a section of descriptions and cutaway photographs of six built-in features. Charts showing performance curve and frame assignments complete the release. — *Leland Ohio Electric Co.*

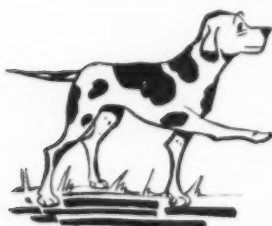
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RECORDERS are described in 12-page Bulletin GEA-6933A. They are direct- and servo-operated, switchboard, and portable recorders, and are listed in accuracy classes of 1/4, 3/10, 1, 2, and 3 percent. The bulletin gives over 40 different electrical and physical parameters and other information includes: specs, dimensions, applications, features, operating data, optional accessories, and product photos. — *General Electric Co.*

circle 214 on reader service card

HEATING, VENTILATING UNITS. An engineering catalog for large units and heat diffusers contains easy-to-read selection charts for steam and hot water coil capacities, fan-motor ratings, and dimensional data. Many charts, graphs, and photos are also here. — *Carrier Air Conditioning Co. Div., Carrier Corp.*

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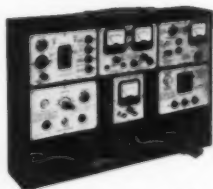


Let AIRSERCO "BIRD DOG" your way to BIGGER PROFITS!

When you specify AIRSERCO PRODUCTS you are buying "THE STANDARD OF THE INDUSTRY" in ...

- TESTING INSTRUMENTS
- PRECISION VISUAL MEASURING EQUIPMENT
- HIGH VACUUM PUMPS, GAUGES, ACCESSORIES

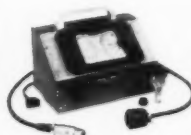
Airserco is the "complete line" from a test cord to a full production line facility.



Hermetic Compressor Analyzer



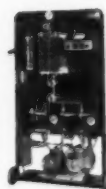
Hermetic Compressor Opener



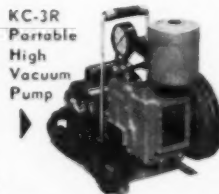
Electric High Vacuum Gauge



Portable Charging Station



Portable Field Service Station



KC-3R Portable High Vacuum Pump

"AIRSERCO... creative leader of the industry since 1933."

AIRSERCO MANUFACTURING CO. Pittsburgh 13, Pa.
THE AIRSERCO BUILDING

Airserco has built more refrigeration testing equipment than any other company in the world.

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Prof. Know How's
CORNER

AIRSERCO
PRODUCT
OF THE
MONTH



'MAGNETIC MEMORY'
POINTERS
for AIRSERCO
REFRIGERANT
CHARGING CYLINDERS



Another Airserco
Money Maker for the
Cooling Service Engineer



**CERTIFIED CAPACITIES,
RELIABILITY,
SERVICE**

decided Western Electric's choice

of KRACK REFRIGERATION UNITS

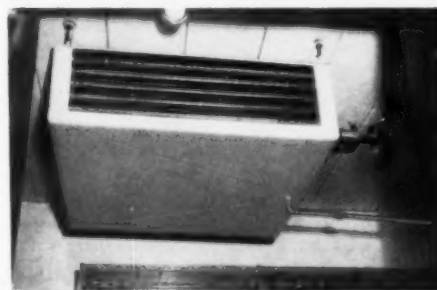
for new Oklahoma City Plant.

Krack equipment relied upon exclusively to keep food garden-fresh in new plant cafeteria.

Each class of food stored—dairy products, fruits and vegetables, meats, salads and bakery goods—needs exact temperature and humidity control to keep food at its peak of flavor and freshness. Krack equipment fully meets these exacting requirements—as expected.



8 walk-in storage rooms, including 2 freezers, all equipped with Krack units, maintain just the right climate for the class of food stored.



Krack unit in salad refrigerator has a special hot-tin-dipped coil for protection against corrosive action of acids in salads.

FREE BULLETIN 620 gives data on reliable low or high temperature refrigeration equipment at production unit cost.



**REFRIGERATION
APPLIANCES, INC.**

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Wholesaler **ACTIVITIES**

Ferris wheel file lets Duncan Supply keep close check on inventories

You can save time and steps in your inventory control system with one like Duncan Supply Co., Indianapolis, uses that enables one girl to post one of 20,000 items in seconds. There are no bulky cabinets to take up space, no tubs of records to leaf through; only eight pushbuttons and a horizontal rotary visible file that turns like a ferris wheel.

The "Card-O-Guide" system, manufactured by Diebold, Inc., keeps accurate and fast checks on every product, from valves to condensing units, stocked in either the

stock), order number, serial number customer. If the product is in stock, the location, usually warehouse, is also added. Warranty period isn't added unless it's longer than a year.

The wholesaler tries to anticipate orders to make sure each card shows several of each product in stock, except those that are seasonal items.

The card is then filed in a removable tray with other cards for the same product made by other manufacturers. The tray is on a rotary drum that shelves the trays like swinging cradles.

Each shelf holds four trays and is keyed to a pushbutton. When a girl wants to post the card for a thermostatic expansion valve, for example, she pushes the button corresponding to the shelf that holds all the TXV cards. The drum revolves until that shelf appears. Then she finds the TXV tray on the shelf and quickly thumbs through it to the right manufacturer.

The shelves and their pushbuttons are keyed to all products, with many items to each shelf. A key near the buttons identifies what products are filed on what shelf on the drum.

A safety feature is that the drum won't revolve when the girl pushes a button if her hand is on a rubber roller between the buttons and the drum, and thus in the area of the drum's turn.

When the operator sees that a product is getting low in stock, she reorders it for stock only. She won't do this in, say, October, though, for certain cooling products, but will wait until about April to reorder when the airconditioning starts to get into full swing. The reverse is true for heating products. She also won't reorder once-in-awhile or now-and-then products.



Duncan Indianapolis or Muncie, Ind., store or on items ordered for direct contractor shipment.

Duncan uses yellow cards for items stocked at its Indianapolis headquarters, green cards for the Muncie branch. All cards, though, are kept and posted at Indianapolis. There's a card for every item except specialty products and all are filed by manufacturer.

When a contractor wants an item not in stock, Duncan makes out a purchase order. The following information from the P.O. is then entered on a card: manufacturer, voltage, phase, model number, date ordered (or withdrawn from

W. J. A. Marshall named CRAW director of ARW

William J. A. Marshall, president of Marshall Refrigeration Co., Ltd., Toronto, Canada, has been elected a director of Air Conditioning & Refrigeration Wholesalers for a 3-year term. He will represent Canadian Refrigeration & Air Conditioning Wholesalers on the board.

The election follows the recent affiliation of CRAW with ARW. Combined membership of the two groups is now 523 locations.

Marshall has been active in the industry since 1928, when he started his own firm. He was educational chairman of Refrigeration Service Engineers Society in Canada from 1939 to 1942 and was elected chapter president in 1942. In 1944 he was elected president of the Canadian RSES, and international president in 1948.

Marshall continues as president of CRAW's Eastern Section.

Houston warehouse opens

L. E. Minns Co., wholesale air-conditioning, heating, refrigeration, and ventilating equipment distributor in Houston, has moved into a new warehouse-sales building. The new location, at 1115 Naylor St., has a 20,000 sq.ft. warehouse and 5,000 sq.ft. city sales and self service area.

George L. Johnston Co. sells service division

George L. Johnston Co., Detroit, has sold its entire service division, Johnston Refrigeration Service, to Dart Heating and Air Conditioning, Inc., Detroit. The sale includes all equipment, service trucks, stocks, service warranties, and maintenance contracts.

Company president George L. Johnston said his firm plans to expand its wholesale operations in Detroit and Grand Rapids. One service manager will assist dealers in new product problems and conduct service schools.

Sure I'm installing H&M V-CONS®
**... they cost less, weigh less,
 and take up less space!**



No wonder these Halstead & Mitchell V-Cons® are the hottest selling air-cooled condensers around. First off, they give full performance yet cost up to 15% less than comparable capacity condensers.

Second, they weigh about half as much because they are housed in light-weight, corrosion-resistant aluminum. The fan blades are aluminum, too. Thus, roof loading is much lower and rigging far easier.

Next, they combine the low height and quiet operation of vertical discharge condensers with the mini-

mal space requirements of horizontal discharge units.

Currently available in 3, 5, 7½, and 10 ton sizes, these new units round out Halstead & Mitchell's line of vertical and horizontal discharge condensers of 3 to 100 ton capacity. All models feature H&M's exclusive Turbu-Flo fins, which improve heat transfer between refrigerant and air.

For more information, contact your wholesaler, or write for Bulletin VC-103. Halstead & Mitchell Co., Dept. D-11, Bessemer Bldg., Pittsburgh 22, Pa.



Halstead & Mitchell

Air-Cooled Condensers • Water-Cooled Condensers • Cooling Towers • Air Handlers and Coils

Export Representative: Sabal-Kielmann, 15 Williams Street, New York, New York

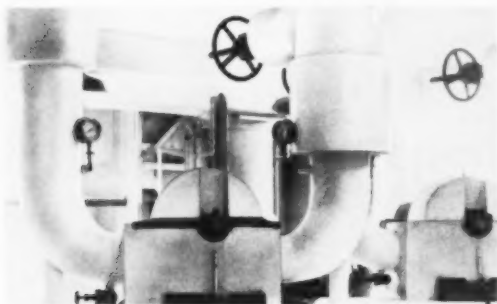
circle 20 on reader service card

RECENT *Installations*

Insulation stops pipe dripping

SHEET AND TUBE foamed plastic insulation covers cold and chilled water lines in the airconditioning system that serves the 4-story general office building of Armstrong Cork Co., Lancaster, Pa. The insulation is necessary to eliminate condensate drip into the acoustical ceilings where the pipes are concealed and onto floors.

Flexible "Armaflex" sheet 1" thick was used for large pipes and tanks and tubular insulation for smaller lines. The material was wrapped around



and sealed at the butt joints with a moisture-resistant adhesive. With preformed pipe covering, the tube is slit, snapped on, and sealed along the slit joint and at butt joints between sections.

The chilled water lines carry liquid at 41 F, with less than a 1 F drop through the longest line, which is about 1000'. The cooling system includes two 500-ton hermetic centrifugal compressors. The chilled water lines serve 19 air distribution centers, each with a dehumidifying coil. More than 8000' of lines from 1 to 16" dia. run above offices and heavy traffic areas.

7 Systems do the work of 30

SEVEN OUTDOOR condensing systems have taken over the work formerly done by 30 separate refrigeration systems in Uncle Dick's Family Market, Bargaintown, N.J. The old $\frac{1}{2}$ to 3 hp units multiplied as the market grew and more fixtures were added. Soon, the warm equipment rooms became a problem and more than \$4000 was spent to maintain the equipment clutter.

Two new 7 $\frac{1}{2}$ -hp units serve 114' of open display case with 26' capacity reserve. A similar unit handles the 3-room meat box and the 44'

frozen food case and storage room use a 10-hp low temperature unit with hot gas defrost. A second low temperature unit serves the -5 to -10 F freezer. Dairy and smoked meat cases share a 5-hp unit and the 3200-cu.ft. outdoor produce room has a 3-hp unit. All of the new units are made by Kramer Trenton Co.

Home for aged gets gas cooling

GAS AIRCONDITIONING has been installed in Royal Oaks Manor, a Duarte, Calif., home for the aged. The 3-story building was built and piped for cooling in 1959, but the equipment wasn't put in until last summer.

A York lithium bromide absorption unit, reportedly the largest gas-fired residential cooling system in the home's gas company system, provides the airconditioning. It cools living quarters, kitchen, dining room, recreational and lounge rooms, administrative offices, and infirmary in the 140,000-sq.ft. building.

Geddes Co., Arcadia, Calif., was the installing contractor.

Outdoor units save indoor space

INSTALLING condensing units in aluminum housings on the roof of Benner Tea Co. saved plenty of room to install evaporators in the 40 F storage room. There wasn't any convenient space for the compressors inside the building so the low gross weight and corrosion



resistance of the Kramer Trenton "Winterstated" units were real boons.

The units are mounted directly above the refrigerated area, keeping refrigerant line runs to a minimum. Ceiling-mounted evaporators are arranged in a single rank high enough along one wall so they don't interfere with the palletted produce.



POWER OPERATED Jamison Electroglide doors are now listed under Re-examination Service of Underwriters' Laboratories, Inc. to meet the highest standards of electrical safety.

Jamison ELECTROGLIDE® doors for Cooler, Freezer and Industrial use now carry the UL label



RAPID OPENING AND CLOSING of Jamison Electroglide speeds traffic, saves refrigeration. Single leaf and bi-parting doors available.

ANOTHER JAMISON FIRST

JAMISON ELECTROGLIDE doors are the first electrically powered refrigerator doors to carry the Underwriters' Laboratories label. This is your assurance that Electroglide is designed and built to meet local code requirements that call for the UL label.

The cost-cutting advantages of Jamison Electroglide are being demonstrated in all types of installations. Wherever there is a problem of high volume traffic, Electroglide accelerates truck or personnel movement with instant automatic opening and closing.

Information on Electroglide—for cooler, freezer or industrial use—is available in a new bulletin from Jamison Cold Storage Door Company, Hagerstown, Md.

JAMISON

COLD STORAGE DOORS

circle 22 on reader service card

People ON THE MOVE

Named manager of market surveys for Allied Chemical's General Chemical Div. is **William E. Houghton**. Other division appointments: **William C. Ruch**, director of development research; **Dr. Robert W. Mason**, director of labora-

tory research; **Charles D. Boyer, Jr.**, director of planning research.

Named district managers for two southeast sales areas by Sporian Valve Co. are **Frank L.**

Vaughn, Birmingham, Ala., and **Alan Owens**, Washington, D.C. Vaughn covers Mississippi, Alabama, Florida, and parts of Tennessee and Louisiana. Owens' territory includes Virginia, North Carolina, Maryland, South Carolina, Georgia, and parts of West Virginia and Tennessee.

Fedders Corp. central airconditioning division appoints **Thomas E. Topham** Pacific region district sales manager.

Arnold A. Granke is appointed sales engineer in Wilmington, Del., for Dunham-Bush airconditioning and heating products. He formerly was with Trane Co.

Newly appointed general manager of Worthington Corp.'s standard pump division is **Patrick L. McManus**. He was formerly director of marketing services for Worthington.

Three promotions in the firm's air conditioning division: **Harold Fleit**, manager of sales; **William E. Roach, Jr.**, New England zone manager; **Walter J. Lesko**, northeast zone manager.

American-Standard's air conditioning division appoints **William A. McCabe** to the post of eastern regional manager.

Pinpoint Leaks IN HALF THE TIME!!

SEARCH
WATSCO
THE LIQUID LEAK DETECTOR

PART NO. DL-1

SEARCH
FOR REFRIGERANT — AIR — GAS SYSTEMS

Simply apply **SEARCH** to the suspicious area and watch the bubbles appear at the leakage point.

SEARCH is not a soap and water solution. It will not drip off upon application. **SEARCH** is a highly viscous formula which clings and wraps itself around the tubing or fitting, thus covering normally "hard to reach" areas.

The unbreakable squeeze type bottle with a self applicator makes application clean and easy.

SEARCH IS A SAFETY MUST FOR AUTOMOBILE AIR CONDITIONING, SINCE IT INCORPORATES NO OPEN FLAME.

WATSCO INC.
1020 E. 15th Street • Hialeah, Florida

FOR ADDITIONAL INFORMATION ASK YOUR WHOLESALEMAN OR WRITE TO US, DEPT. B-11

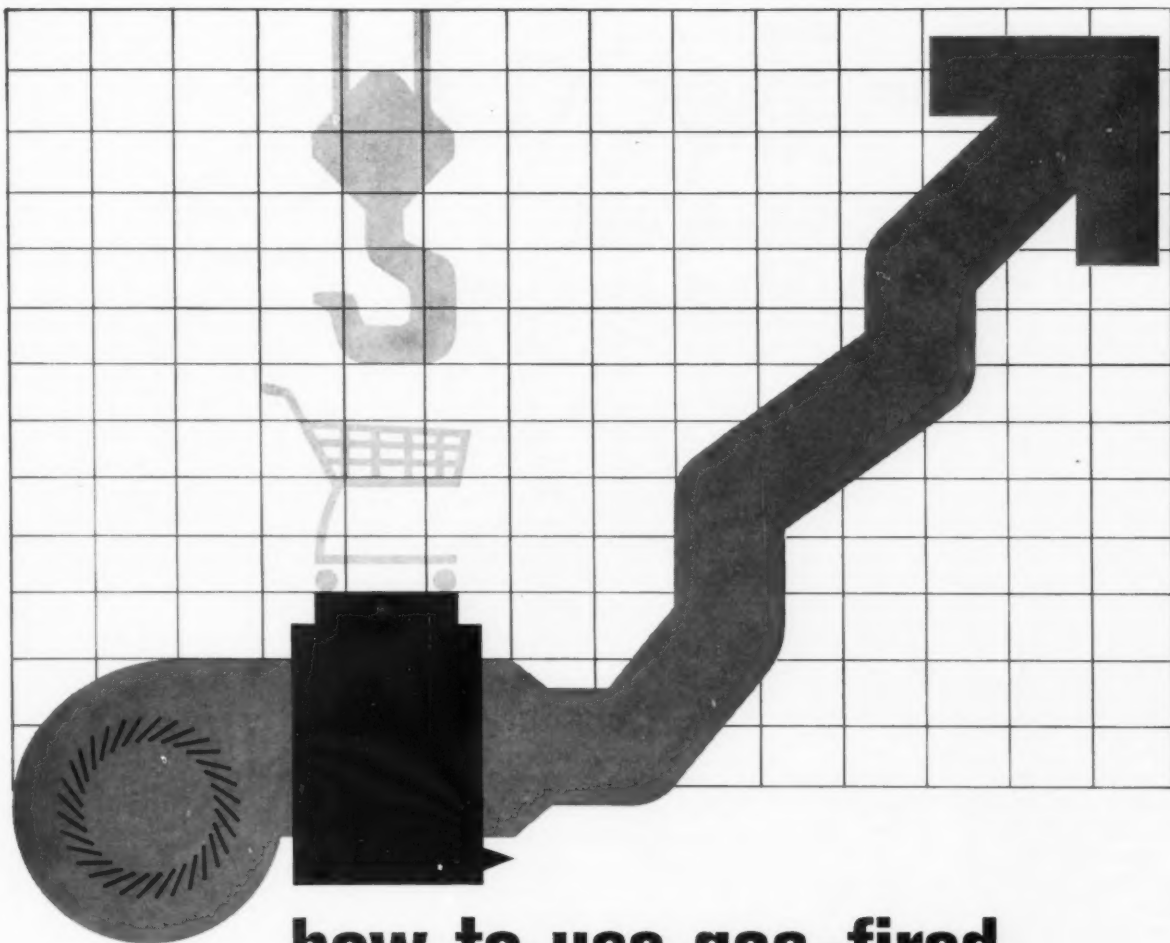
circle 57 on reader service card

CLASSIFIED ADVERTISING

Classified Advertising Rates: \$20 for first column inch; \$15 for each additional column inch or fraction. All classified advertising payable in advance.

WANTED TO BUY

WILL BUY surplus parts for large Freon and Ammonia systems. (York, Carrier, Frick, Worthington, Vilter.) Send list with parts numbers. Box 1161, THE REFRIGERATION & AIRCONDITIONING BUSINESS, 812 Huron Rd., Cleveland 15, Ohio.



how to use gas-fired duct furnaces most profitably



Free from Reznor: the third in a series of new Reznor Heating Handbooks, "Commercial and Industrial Applications of Duct Furnaces."

Duct furnaces offer a relatively new way of heating through air distributing systems. They provide all the economies of direct fired heaters, yet may be located at a distance from the space to be heated. Installation is easy — just connect gas pipe, power, and a vent.

To use duct furnaces most advantageously requires some knowledge of special considerations involved in specific commercial and industrial applications.

That's the purpose of this new handbook, published by Reznor, the world's largest manufacturer of gas unit heaters. It tells about the various ways Reznor duct furnaces can be used for heating or in combination with cooling systems. Also included are illustrations, load calculating data, and practical suggestions to help you get better heating at lower cost.

For your copy, mail the coupon to Reznor. And for more information on Reznor heaters, call your distributor or nearby district office listed in the Yellow Pages under "Heaters-Unit".



REZNOR HEATERS

REZNOR MANUFACTURING COMPANY
Dept. RAC-11, Mercer, Pa.

Send me a copy of "Commercial and Industrial Applications of Duct Furnaces".

name _____ title _____
company _____
address _____
city _____ state _____

circle 42 on reader service card

BUSINESS *Briefs*

ASA starts new standards study of ventilating, lighting requirements

A target date of February 1962 has been set for the first meeting of a reorganized committee of the American Standards Association to study ventilation and light standards for building code requirements.

As part of the study, the committee will look into minimum for airconditioning specifications.

The new study was started at the request of the American Society of Heating, Refrigeration, and Air-Conditioning Engineers, the Illuminating Engineering Society, and the American Public Health Association. Subcommittees on ventilation and light have already started work and will present preliminary drafts at the first meeting.

Administrative sponsor of the February meeting is the American Public Health Association, with ASHRAE and IES as co-sponsors. Seventeen organizations and asso-

ciations in ventilating and lighting have been invited to participate. Steering committee members include Andrew T. Boggs and John G. Eadie of ASHRAE, Francis B. Elder of APHA, and C. L. Crouch of IES.

Delaware builders push new-home airconditioning

A special campaign promoting central airconditioning has stimulated new home sales in the Wilmington, Del., area. Based on the theme, "The Crowning Touch . . . year-round, whole-home airconditioning," the campaign is credited with rejuvenating Delaware's sluggish housing market with more than \$3 million in new home sales.

The project was started last May after six months' planning by Air Conditioning & Refrigeration Institute and House & Home magazine. Nine builders signed up with the project and agreed to offer new homes with airconditioning as standard equipment.

A hard hitting advertising campaign stimulated the interest of area residents so that more than 75,000 persons visited "Crowning Touch" homes during the summer.

Aerovox introduces 2-year warranty

Capacitors and resistors made by Aerovox Corp. now are sold with a 2-year warranty. A 1-year warranty has been traditional in the electrical and electronic components industry. According to company officials, new laboratory facilities, production tools and equipment, manufacturing techniques, and quality control procedures permit the 2-year warranty policy. It is in effect at all company divisions. No price increases are expected.

CALENDAR OF EVENTS

November 2-5, 1961

Refrigeration Service Engineers Society (Annual Convention)
Royal York Hotel
Toronto, Canada

November 8-10, 1961

National Warm Air Heating and Air Conditioning Association (Annual Convention)
La Salle Hotel
Chicago, Ill.

November 12-15, 1961

Air-Conditioning and Refrigeration Institute (Annual Meeting)
The Homestead
Hot Springs, Va.

November 16, 1961

National Electrical Manufacturing Association (Annual Meeting)
The Plaza
New York City

January 28-31, 1962

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (Semi-Annual Meeting)
Chase-Park Plaza Hotel
St. Louis, Mo.

AAF studying adaption of products for shelters

Four officials of American Air Filter Co. met recently to study the adaption of company products relating to environmental control and air supply to community Civil Defense fall-out shelters. Under consideration was the adaption of these products to a packaged system for air distribution, filtration, heating, ventilating, and airconditioning of shelters.

Vice president Howard M. Fitch, marketing manager Charles S. Stock, and product group managers John M. Kane and William H.

Continued on page 62

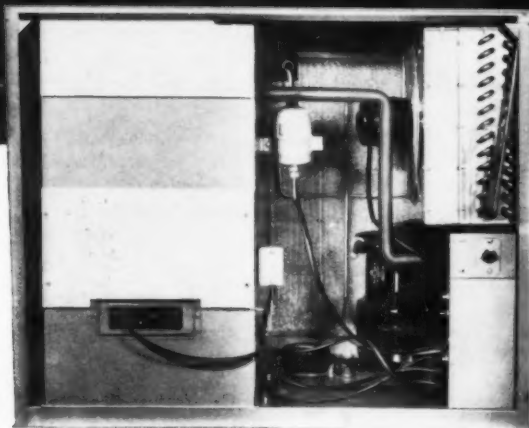


FREE CAPACITOR TESTS can be performed with this counter display from Watsco, Inc. It features "Cappy," the pocket-size instrument for testing faulty capacitors, line voltage, continuity, fuses, motor windings, and appliances. Watsco calls the display its "silent salesman."

Crystal Tips ICE MAKERS

*simple design
saves you...*

MONEY



Ice-making section of Crystal Tips B-500 air cooled model. Notice how few parts are needed. Also remember this model will make more ice per day (1/4 ton) than any other ice maker anywhere near its price or size. Service is seldom needed but when it is — it can be handled quickly — because all parts are easily accessible from the top of every Crystal Tips model.

This thin but very adequate service manual tells the story about Crystal Tips service procedures.

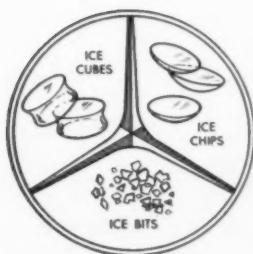


sales and service are easier with Crystal Tips ice makers

Uncomplicated design means trouble-free performance for Crystal Tips users. This means Crystal Tips distributors make fewer service calls and devote their time to *selling* Crystal Tips ice makers rather than servicing them.

Crystal Tips ice makers not only save you money on service but they give you *more to sell* — more honest features that customers want and appreciate . . . simplified design; larger capacities; unbelievably simple, patented 2-in-1 ice making; larger storage bins; 3 types of ice!

If you want to make and *keep* more profit on every ice maker you sell, find out how you can become a Crystal Tips distributor — find out about Crystal Tips *larger profit margins for distributors*. Write today for complete facts.



Crystal Tips

FIRST NAME IN
AUTOMATIC ICE MAKERS

A Division of McQuay, Inc.

AMERICAN AUTOMATIC ICE MACHINE CO.
DEPT. 171, 1600 BROADWAY N. E. • MINNEAPOLIS, MINNESOTA



circle 6 on reader service card

circle 8 on reader service card



Keep air-conditioning and refrigeration units operating at peak efficiency by preventing the formation of rust and scale in condenser tubes and circulating lines. ANCO keeps lines open and free from destructive build-up, sludge stays fluid for easy removal. In self-feeding cans for convenient use.



- Inexpensive
- Safe for metals
- Prevents rust, pitting and scale
- Added protection for towers

Buy ANCO for sure profits
Condenser Cleaner
Water Treatment • Algaecide



BUSINESS *Briefs*

Continued from page 60

Rodgers made the study. Said Stock, "We are convinced after thorough study that it is possible to use or modify many of our products and to develop new products that might be applicable to both area-size and individual residential shelters."

Two companies increase international expansion

Controls Co. of America has new manufacturing plants in France and England. Earlier this year, the firm formed a German sales and service company.

The Chicago-based company also has a Swiss subsidiary and operations in Holland, Argentina, Brazil, and Canada.

A recent agreement between *Tyler Refrigeration International* and *Etablissements Bonnet* in France

provides for a new Bonnet division to make and sell Tyler products throughout France.

Tyler has other foreign plants in West Germany and Canada, plus an agreement with *Frigrite Ltd.* to cover Australia.

Acme opens Miami office

Acme Industries, Inc., is expanding its field sales engineering service in Southern Florida by opening a Miami office and appointing two area sales engineers. Representatives are Donald K. Dorini, Fort Lauderdale, and Marion K. Cox, Miami. The sales office is at 4646 N. W. 183rd St., Opa-Locka.

Switch division moves

American-Standard Controls Div. has moved manufacture of its Tyni-Switch miniature snap switches from Stratford, Conn., to Rochester, N.Y. All production, engineering, sales, and service activities for the line are being combined with the firm's precision gage facilities at the Rochester plant.



RILO - Detector

MADE IN SWITZERLAND

New adjustable Leak detector for Halogen gases, such as "Freon", "Frigen", "Arcton" etc.

Highest Sensitivity:

Capable of detecting leaks as small as 0.2 ounces per year and less.

Calibrated Zero Adjustment

to compensate for background level in rooms already contaminated with halogen vapors.

Optical and Audible Indication:

Leak indicating instrument combined with buzzer.

Easy to Operate:

Connect cord to power source, adjust sensitivity and zero setting and check the leaking unit with suction hose.

Small Power Consumption:

60 Watt either 110 or 220 Volt AC, 50 or 60 Cycles.

Net weight approx. 10 lbs.

MANUFACTURED BY:

RICHARD LOTTENBACH

GENERAL REPRESENTATIVE WANTED FOR U.S.A.

Weltstrasse 5, Zurich 2, Switzerland

circle 29 on reader service card

Why dealers want the Scotsman franchise



Scotsman Super Cubers are available in capacities from 50 lbs. to 500 lbs. Cabinets install under counter, against wall, as built-ins. Only one water and one drain connection, standard electric connections.



Scotsman Super Flakers have self-contained, heavily insulated storage bins. Thermostat automatically controls refilling of bin. Capacities from 100 lbs. to 4,500 lbs. Operate from standard electric connections.

The market doesn't have to be cultivated. It's already there with the spadework done. And it's expanding fast. Scotsman ice machines can be sold wherever food or drinks are served: restaurants, drive-ins, hospitals, clubs, bars, schools and institutions.

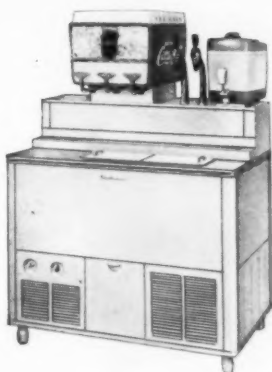
Your customers think well of Scotsman. How do we know? Because Scotsman is the largest selling brand of ice machines year after year. We think this means customers have a preference for Scotsman's quality and dependability. We use product research to find ways to continually make Scotsman better . . . and to give you what your customers need.

We advertise . . . more than anyone else in the ice machine industry. True again this year as in other years. Scotsman has full schedules in trade magazines to blanket every market. Many ads will be in full color. Your prospects will be pre-sold on Scotsman quality and dependability.

Dealers sell more when they make money. And Scotsman dealers make money. Dealerships are carefully selected so that each dealer can have a profitable volume of business. Besides the profits from full markup, Scotsman dealers enjoy a continuous and profitable income from related products.

If you're interested in making money . . . mail in the coupon now for complete facts about the Scotsman dealer franchise.

QUEEN PRODUCTS DIVISION • KING-SEELEY **KST** THERMOS CO., Albert Lea, Minn.



Scotsman Combination Ice Machine and Drink Dispenser available in two models. Produce and store from 350 lbs. to 650 lbs. of ice per day. Will dispense two, three or four flavors. Two draft arms for plain cold water and carbonated water.

**Please
send me
dealer
franchise
information**

Name _____

Firm _____

Address _____

City _____

Zone _____ State _____

Mail to: Queen Products Division,
King-Seeley Thermos Co.,
1911 Front Street, Albert Lea, Minn.

You profit most with

SCOTSMAN®
I C E M A C H I N E S

circle 45 on reader service card

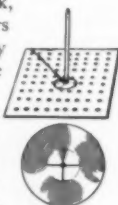
**SAVE TIME—
SAVE MONEY**
with these dependable
INSULATION HANGERS



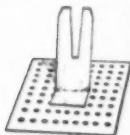
GEMCO

**Spindle Hangers and
W-A Self-Locking Washers**

Ideal for insulation work, Gemco Spindle Hangers are easily and quickly installed... with positive adhesion to concrete, brick or metal. W-A Self-Locking Washers pressed over spindles with minimum effort and lock insulation securely in place.



GEMCO Pronged Hangers



Designed especially for supporting various types of block insulation. Easily applied for positive adhesion. Prongs (available in various lengths from 1 3/8" to 6 3/8") bend over to hold insulation firmly in place.

TUFF-WELD Nylon Hangers

Two-piece hangers... with bases of tough, mold nylon and spindles of metal. Made especially for smooth surfaces.

Spindles snapped into bases as needed; reduces inventory, storage space, freight costs. W-A Self-locking washers hold insulation securely in place.



TUFF-BOND Quik-Set Adhesive (for smooth or slightly irregular surfaces) and Improved General Purpose Adhesive (for rougher surfaces) assure permanent adhesion of hangers when used as directed. Write or wire for details and specifications.

GOODLOE E. MOORE
INCORPORATED
DANVILLE 29, ILLINOIS

circle 32 on reader service card

Product **DATA**

Continued from page 28

Cryogenic control valve

Throttling cryogenic control valve that's tight closing (0 leakage) through cooldown, on-stream runs, and defrost. Has cage-trim to eliminate seat ring threads and gasket crush, and can be



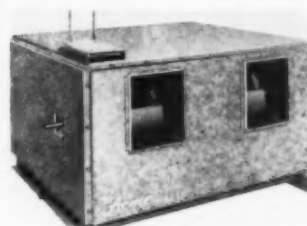
disassembled from top end. Imbedded in insulation or cold box for valve characteristic change without removal of valve body from pipeline. In 1/2 to 4" bronze or aluminum bodies or 1/2 to 2" stainless steel. — *Leslie Co.*

circle 147 on reader service card

Air handler

Will heat or cool, remove dirt, humidify, dehumidify, or serve as air circulator. Will operate with steam or hot water, water chiller or direct expansion coil. In 37 horizontal, vertical, and

multi-zone units in 14 sizes from 600 to 44,000 cfm and nominal outlet velocity of 1600 fpm. Is made of 14 and



16 gage galvanized metal and 1" glass fiber insulation. Two to four coil sizes for each size casing, six motor positions and four fan discharge positions. Other features: fans mounted on hollow shafts; external, self-aligning ball bearings; panels on specific center are fastened with hexagon head screws. Accessories: throwaway glass wool and cleanable metal filters, water spray, steam grid, and steam pan humidifiers. — *Acme Industries, Inc.*

circle 148 on reader service card

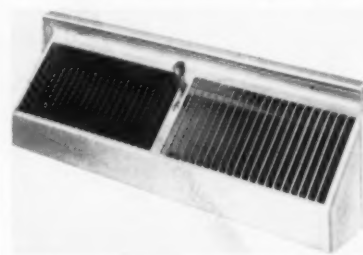
Rigid roof insulation

Rigid roof insulation of urethane foam to which roofing membranes have been laminated on both sides. Other features: does not absorb water; lamination prevents warping; panels can be applied directly in hot roofing bitumen; panels don't expand, contract, or change shape. — *Barrett Div., Allied Chemical Corp.*

circle 149 on reader service card

Baseboard diffuser

Model 175 baseboard diffuser 15" wide, 38 sq.in. free area, and adjustable fins preset to blanket up to 13' of



wall with fan-shaped pattern. Diffuser face removable and replaceable for easy installation on subfloor or finished floor, against wall or plastered into it. Two built-in clips hold any 2 1/2" boot up to 14" wide in place. No fitting or flanging needed. Damper opening can be limited by adjustable stop to balance system at diffuser face. Finished in beige baked enamel. — *Air Control Products, Inc.*

circle 150 on reader service card

Surface set core bit

Manufactured with diamonds random set in non-spiral pattern. Has strong

Continued on page 66

"Robbi's"
KLOS-KUT
TUBING CUTTER

ACTUAL SIZE

Pat. No.
2,941,291

Requires only 2-INCH CLEARANCE from center of 1/4" through 7/8" O.D. tubing.

Contact your **ROBBI** wholesaler.

ROBINAIR MANUFACTURING CORP.

circle 43 on reader service card

ONLY
*urethane
foam*
GIVES YOU

MAXIMUM INSULATION VALUE
AT HALF THE STANDARD THICKNESS



While insulating utility truck crew cabs for sub-zero operation with sprayed-in-place urethane foam, Insul-Mastic Eastern, Ltd., Toronto, again proved what refrigerator and reefer van makers discovered: Urethane foam's low thermal transmission (k) factor of 0.11 to 0.15 at 70°F provides up to twice the efficiency of glass fiber (0.22) and is quicker and easier to install.

In reefer vans, urethane foam's double insulating efficiency permits reduction of wall thickness; adds up to more payload space; cuts maintenance cost to near zero. Sprayed- or poured-in-place urethane foam bonds to any surface, expands to fill cracks and voids, hugs every contour snugly to seal off air leaks.

For documented case history information on how urethane foam is providing maximum insulation protection with a minimum of time, labor, equipment and materials for mobile and fixed refrigerated units—including a 3-million square-foot warehouse—write Mobay Chemical Company, Code RC-1, Pittsburgh 5, Pa.



Reduced to three basic steps—masking, spraying, curing—urethane foam may be sprayed in place with the ease and economy of paint spraying.

Mobay is the leading supplier of quality chemicals used in the manufacture of both polyether and polyester urethane foams.



circle 61 on reader service card

F-40

Product DATA

Continued from page 64

core barrels to reduce barrel rupture and eliminate bit failure. It is not resettable, will cut fast in critical areas and steel-reinforced concrete. Line of core bits also includes surface set oriented and impregnated throwaway bits. — *Clipper Mfg. Co.*

circle 151 on reader service card

Filter screen assembly

Screen, with generator, forms operating component of "Statronic" electronic, dust, dirt, and odor control system. Unit and assembly available in range of 452 sizes among 12 types covering range of 450 to 30,000 cfm. Combinations can be selected to extend sizes to 1124 up to 80,000 cfm in one system because of modular design. Screen unit consists of steel casing (with access door, safety switch, high voltage socket, and duct flanges) and slideout screen assembly. Screen assembly is three assembled screens with high voltage disconnect and set of tracks for installation into existing duct, plenum, or air handler.

Built for static or RF systems. System requires screen units or screen assemblies in return air plenum of air handling system. Two screens in assembly charged by output of electronic static generator. Second screen connected to ground for dirt and dust control. For all three controls, screen connected to RF generator. — *CRS Industries, Inc.*

circle 152 on reader service card

Hygrometer, thermometer

Model AB2T Hygrometer and Model TAB3T thermometer for flush mounting with measuring elements that project through wall to 1" and measure T-H on other side. Hygrometer for use in temperatures up to 230 F, has dial diameter of 5-1/2", overall diameter of 7", and brass casing. Thermometer measures from -30 to 130 F, has same diameters and casing as hygrometer. — *Abrax Instrument Corp.*

circle 153 on reader service card

YEARS IN USE... AND IT LOOKS LIKE NEW!



Erecta-Shelf installed in their ice cream hardening vault has taught General Manager Ben Collins of Goble's Dairyland Products (Wichita Falls, Texas) the value of genuine quality.

Condensation caused by defrosts have repeatedly soaked every surface of Goble's Erecta-Shelves. But there's no sign of rust or any other harmful effect.

Alterations of entire shelving sections are often made to conform to changes in product load. As much as 960 pounds has been stored on 4 foot sections without a sign of deflection! And, though strong, Erecta-Shelf is light enough to be assembled and handled by one man. No other shelving combines such strength and lightweight construction.

Erecta-Shelf's steel rods (in heavy chrome plate or stainless steel) do not collect dirt as flat shelves do. They permit free air circulation for better results in the hardening room!

If you're interested in economical maintenance free shelving that performs and looks new year after year — and saves accordingly, write for literature today.

Available chrome plated or stainless steel



The Seal of Sanitation Quality!

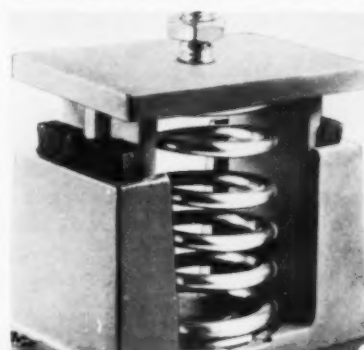
ERECTA SHELF®

A quality product of METROPOLITAN WIRE GOODS CORP.
N. Washington St. and George Ave. • Wilkes-Barre, Pa.

circle 30 on reader service card

Equipment mounting

Type LNAA spring isolation mounting in load capacities from 50 to 540 lb. depending on selection and insertion of four springs into isolator housings. Housing, of cast semi-steel, is 3 3/4 x 3 3/4 x 5 1/4",



has access port on each side for easy cleaning and inspection, field-changing of spring. Other mounting features: external lever so no need for shims, sponge rubber snubbing chocks to restrict lateral movement without disturbance transmission. — *Korfund Co., Inc.*

circle 154 on reader service card

Replacement controls kit

"Star Line" SL-4 heat equipment replacement controls kit with assortment of six fan switches, three high limit controls, and 13 detachable flanges. Replacement controls, flanges, manual reset and single-pole double-throw devices available separately — *Metals & Controls Div., Texas Instruments, Inc.*

circle 155 on reader service card

Blower motor

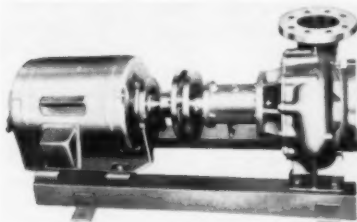
Split-phase blower motor in 1/2 and 1/4 hp for belt-drive blowers and fans in either 115- or 115/230 v. models. Has low starting torque and smooth acceleration. Starts at less than full-load torque,

causes less belt wear, reduces starting noise. No high starting torque to create momentary excessive load on both motor and blower jackshaft bearings. Winding design eliminates light flicker. — *Industrial Motor Dept., Westinghouse Electric Corp.*

circle 156 on reader service card

Centrifugal pump

Model B9 centrifugal pump features sleeve bearing forced feed lubrication for long bearing life and self aligning coupling that connects sleeve bearing

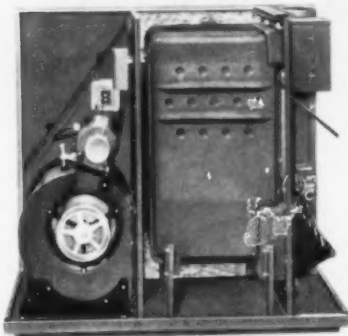


motor to pump. Other features include fabricated angle iron base, 1750-rpm sleeve bearing motor, capacity to 1000 gpm, and heads to 80'. In addition to line of in-line circulators and A5 and A9 close coupled centrifugal pumps. — *Dunham-Bush, Inc.*

circle 157 on reader service card

Winter airconditioner

"Luxaire" Series SA gas-fired basement winter airconditioner with capacity from 100,000 to 200,000 Btuh input in steps of 25,000 Btuh. Heavy gage heat



exchanger die-formed from 16 gage steel and end-welded with submerged arc welding. Cabinet conceals gas manifold, controls, burners, and built-in draft hood. — *C. A. Olsen Mfg. Co.*

circle 158 on reader service card

Home airconditioner

"Quik-Attach" (Model TA22G) 2-ton residential airconditioner with flexibility of split-system and installation and factory-sealed advantages of integral units. Condensing unit can be outdoors and cooling coil connected to it with pre-charged tubing that eliminates brazed joints. Standard: filter-drier, low-

pressure cutout, 2-speed fan motor with sealed bearings. Accessories: straight-line thermostat, coil enclosures. — *Air Conditioning Dept., General Electric Co.*

circle 159 on reader service card

4-way testing unit

Allows evacuation, charging, and testing of any system without disconnecting from refrigerant supply or from vacuum pump. No need to blow out refrigerant after pulling vacuum. To operate: hook up to refrigerant supply, vacuum pump, highside and lowside, and test. Four valves on unit, all with nylon seats and "Teflon" packing, assure easy operations. Has forged brass

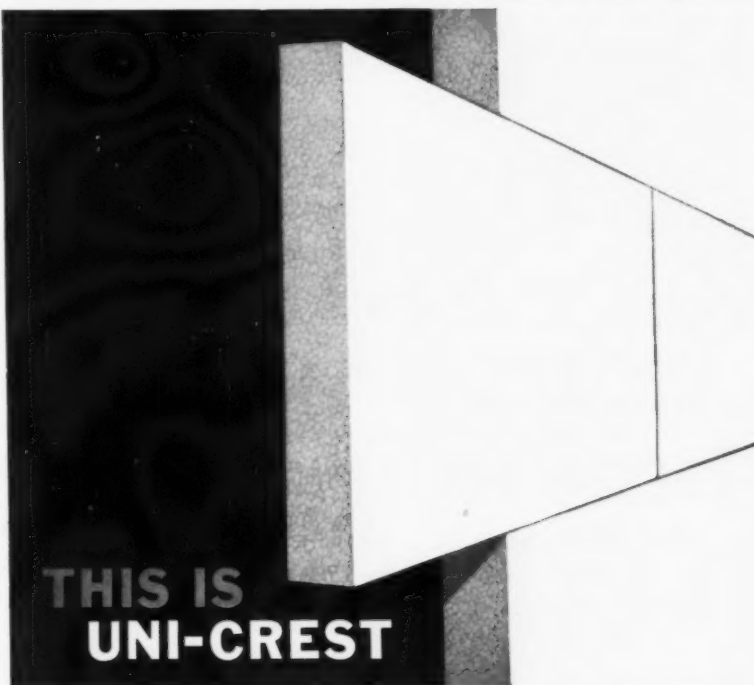
bodies and metal handwheels. — *Madden Brass Products Co.*

circle 160 on reader service card

Reefer unit

Model SRL provides peak performance for both trailer cooling and heating. Heating capacity boosted by accumulator and super-heating coil and operation controlled by thermostat with -20 to 80 F range. Unit's defrosting automatically started and has air pressure defrost switch actuated by frost accumulation which results in change in pressure of air flowing through evap-

Continued on page 68



a new, economical, low temperature insulation

Uni-Crest is an extremely lightweight homogeneous white material with a smooth, tough surface. It is composed of minute, individually closed cells, produced by expanding beads of polystyrene. Its inherent properties make it an excellent low temperature insulating material.

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In one sturdy carrying case, the kit also includes an adjustable gas pressure regulator, torch handle, and hose—everything for the installation, repair, and everyday maintenance of all types of refrigeration and air conditioning systems. See your local Prest-O-Lite dealer. Or write Linde Company, Division of Union Carbide Corporation, 270 Park Ave., New York 17, N.Y.

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circle 28 on reader service card

Product DATA

Continued from page 67

orator coil. Also manual defrosting. Control panel has quick disconnect plugs and safety controls have cranking limit switch, low oil pressure and high engine temperature cutouts, and starter-generator circuit breaker switch. Unit factory-assembled and -tested and evaporator and condenser sections one major assembly in opening in front of trailer. Powered by 4-cyl., water-cooled engine and can be equipped with gasoline or propane fuel. Electric standby optional. —Thermo King Corp.

circle 161 on reader service card

Diaphragm valve

Solder tube extensions with nickel-silver insert cuts heat transfer, allows quick installation without wet packing or disassembly. Heat stabilized nylon seats improve wear resistance, positive shutoff. Beryllium copper diaphragm resists stem wear, lower stainless steel diaphragm protects against upper assembly corrosion. Also has angle or 2-way flare, female pipe, or solder connections. —Imperial Eastman Corp.

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Condensing unit

10-ton condensing unit with capacity control. For rooftop installation. Weighs 870 lb., stands 20- $\frac{3}{4}$ " high without legs, which adjust to 12 or 18" heights. Vertical discharge propeller fans, controls that automatically unload two cylinders to give $\frac{1}{2}$ capacity, and control circuit that prevents rapid cycling of compressor and reduces electric system's starting load are other features. Zinc-coated steel has baked green enamel finish. Compressor and controls in separate compartment for service without fan dangers. Fans shielded by closely-spaced wire guards. —Carrier Air Conditioning Co. Div., Carrier Corp.

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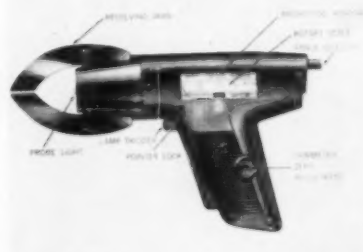
Refrigeration desiccant

Molecular sieve 4A-XH beads desiccant with high capacity of beads for water and acid, less R-22 decomposition and more attrition resistance, crush strength, and bulk density. —Linde Co. Div., Union Carbide Corp.

circle 164 on reader service card

Electrical meter

"Pistolmeter" hand-operable instrument for measuring current, voltages, resistance in areas as cramped gutters and cable boxes. Locking device on meter pointer lets you make reading after meter removed from tested conductor. Has color-coded rotary scale



with current ranges: 0-15/60/200/600 amps; 0-150/600 v.; 0-500/5000 ohms. Furnished with test leads, battery charger, and holster-carrier. —Federal Pacific Electric Co.

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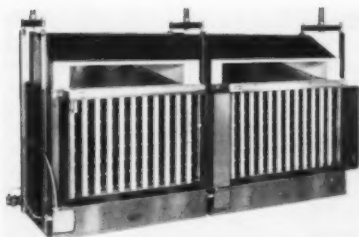
Baseboard element

"Panel-Track" baseboard element with four tracks of polypropylene clipped one on corner of each fin. Eliminates product shipment damage, cut hands, and metal-to-metal fin contact. —Embassy Industries, Inc.

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Gas duct furnace

Has low air pressure drop and for airconditioning systems where bypass ducts too bulky or expensive. Moisture formed inside heat exchanger tubes in summer diverted by stainless steel condensate shield away from pilot, thermo-

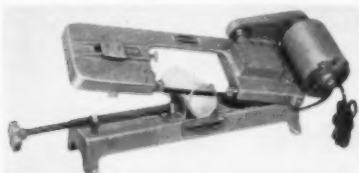


couple, ignition slots, into aluminized steel bottom pan with threaded drain connection. May be ordered with modulating gas valves. In seven sizes from 75,000 to 300,000 Btuh. Optional are: modulating and 2-stage gas valves, dual-fuel controls, electric ignition, adjustable air bypass sections, enclosed blower sections, hi-velocity nozzles and regulators. Fan and blower models up to 300,000 Btuh. — *Hastings Air Control, Inc.*

circle 167 on reader service card

Band saw

"Little G" horizontal metal-cutting saw that uses $\frac{1}{8}$ x 0.020 x 59" blade with accuracy within 0.005" on 3" cut. Rectangular capacity $3\frac{1}{2}$ x 6", diameters to $3\frac{1}{2}$ ", angle cuts to 45 degrees on sizes up to $3\frac{1}{2}$ x 3". Cutting assembly counter-



balanced, automatic shutoff switch, 7" dia. pulleys and blade guides, adjustable takeup are other features. Front bed extension for facing operations provided; bed size 7 x 25 $\frac{1}{2}$ ". Working parts mounted on anti-friction ball bearings and 10-pitch worm gear drive operates in oil bath. — *Griseer Industries, Inc.*

circle 168 on reader service card

Roof exhauster

"Linea" centrifugal and axial flow roof exhauster with lateral discharge. In extruded aluminum louver housing, louver blades give horizontal sweep. Available as centrifugal exhauster or with propeller blade. In motor hp from $\frac{1}{2}$ to 1 $\frac{1}{2}$, fan rpm from 180 to 1725, and these accessories: backdraft shutters, bird screens, storm shields, disconnect switches. — *Penn Ventilator Co., Inc.*

circle 169 on reader service card

Transistor cooler

Model F-3TC "Frigistor" thermoelectric cooling module of high pumping capacity for use with TO-3, TO-41 transistor cases. Has three TE couples, cold sides of which extract heat from transistor cases. Heat pumped out to cooler's other side and rejected to chassis, fins, or heat sink. Provides cooling at any current up to 17 amps and oper-

ating voltage is 0.3 v. At maximum current, will pump 4.25 watts minimum across temperature difference of 32 F. At zero watts load, will provide temperature difference of at least 97 F. — *General Thermoelectric Corp.*

circle 170 on reader service card

Masonry drills

"Joran" carbide tipped masonry drills in sizes from $\frac{1}{8}$ through 1". Overall lengths from 3 to 20" and shank diameter sizes from $\frac{1}{8}$ to $\frac{1}{2}$ ". Grooves in flutes aid in dust and particle removal and tip securely mounted in tempered steel shaft.

— *Danish Import.*

circle 171 on reader service card

Suction pump

Model C-15-Type RHK fractional horsepower, single stage-single suction pump for handling non-corrosive clear liquids up to 180 F. In range through 48 gpm with heads to 100', cast-iron pump has enclosed impellers and screwed connections. Can be installed horizontally or vertically and self-venting casings have center line discharge and can be rotated to any of four positions 90 degrees apart. Horsepower ratings from $\frac{1}{3}$ through 1 in both single and 3-phase construction at 3450 rpm. — *Allis-Chalmers Mfg. Co.*

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Continued on page 70



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Product DATA

Continued from page 69

Rooftop condensing unit

Remote air-cooled rooftop condensing unit (Models 96 AR-3, 120 AR-3) has 90,000 and 118,000 Btu capacities, overall height of 51" and condenser coil mounted horizontally. Air discharge up-



ward from large diameter belt-driven fan. Weatherproof casing of heavy gage aluminum reinforced with steel. Respective weights are 800 and 1100 lb. — Day & Night Mfg. Co.

circle 173 on reader service card

Shelf truck

"Markmobile" heavy duty shelf truck 3, 4, or 5 tiers high. Has 1-piece, die-formed slotted shelves attached to tubular posts for adjustment of shelf spacing and easy removal or addition of shelves. In stainless or galvanized steel. Bottom shelf may be slotted or solid and alternate construction includes back and end ledges for each shelf. — Market Forge Co.

circle 174 on reader service card

Cleaning solvent

"V-Sol" cleaning solvent with much less toxicity than carbon tet. Is non-flammable and will remove oil, grease, wax, and tars. Suitable for dip cleaning, cold cleaning, bucket cleaning. When for dip cleaning, furnished in portable 5-gal. container fitted with adjustable metal tray. Also in 1-gal. cans and 55-gal. drums. — Speco, Inc.

circle 175 on reader service card

High vacuum pump

"Welch Duo-Seal" high vacuum pump for evacuating and dehydrating refrigerant systems. In four sizes: 0.75 cfm, 2 cfm (shown), 5 cfm, 15 cfm capacities, all which draw down to 0.1 micron efficiency. All of the 2-stage rotary models are vented-exhaust (gas ballast) types which reduce pumpdown time and require fewer oil changes, and all oil-charged and equipped with elec-

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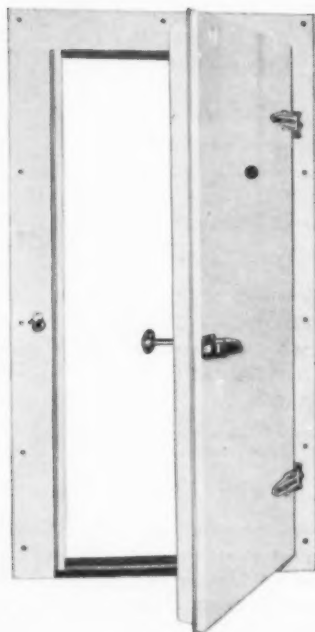
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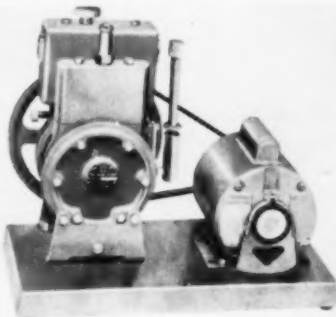


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trical cord and in-line switch. The "Duo-Seal" provides bypass at seal to carry off last increment of gas which may escape exhaust port, and this operation repeated twice each revolution or at least 600 times a minute, and each time



pressure in vessel connected to intake is reduced to form higher vacuum. Vented exhaust lets moisture pass through pump instead of condensing into oil to pull higher vacuum faster and without trapping and excessive oil changes. — *Robinair Mfg. Corp.*

circle 176 on reader service card

Gas unit heater

Series NB gas unit heater with centrifugal blower. For installations where extreme low operational noise level rules out propeller fan units. Overcomes duct resistance and for use with natural, manufactured, mixed, and li-



quefied petroleum gases and gas-air mixtures. In eight sizes with heating capacities from 50,000 to 250,000 Btuh input. Equipped with high limit switch, gas — valve, constant burning light, pilot switch, gas pressure regulator. — *Industrial Div., American-Standard.*

circle 177 on reader service card

Airfoil fan

Model SQ airfoil fan in sizes 12½ to 18½ in single and double inlets. Static pressures of ¼ to 9" and air volumes up to 15,000 cfm with temperatures up to 200 F. Very steep pressure characteristics, air-tight steel housing, aluminum alloy wheels are other features. Arrangement 2 and 3 fans belt-driven. — *Chicago Blower Corp.*

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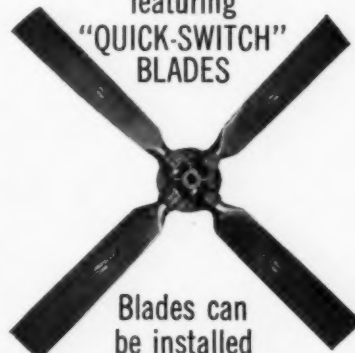
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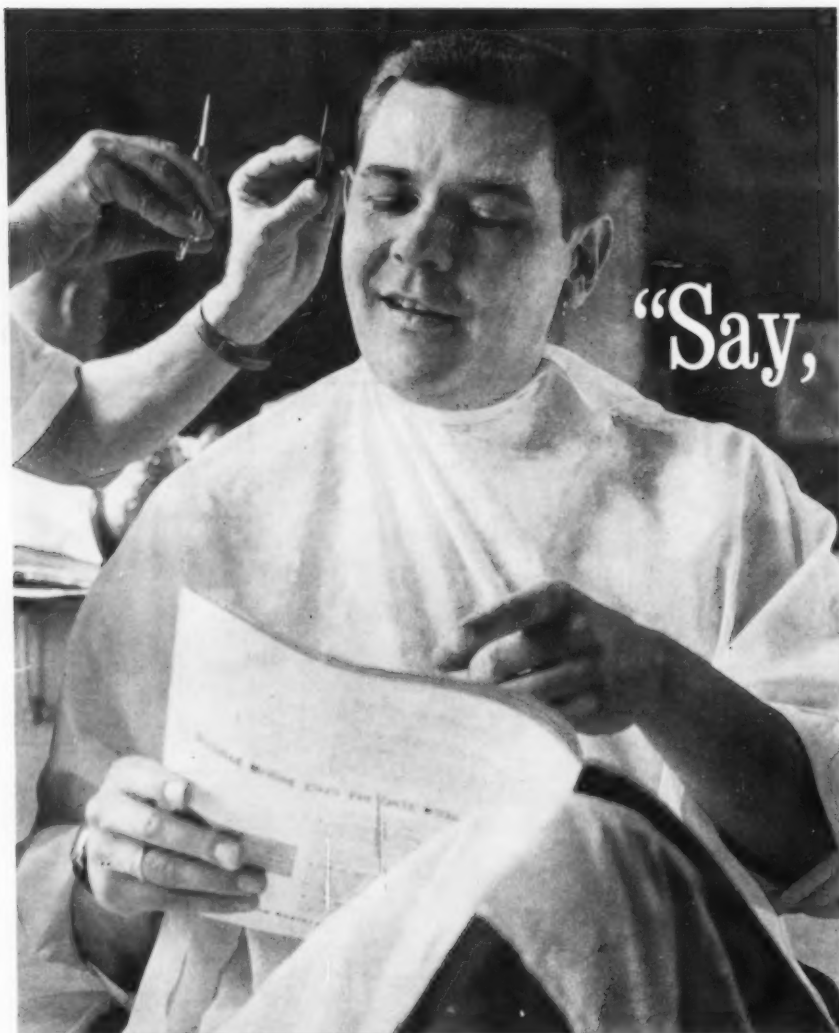
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